The Builder.

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The Antwerp Congress.

WHEN the foreign members attending the International Archæological Congress arrived in Antwerp on the 25th ult. they were cordially received in the Hôtel de Ville, took *le vin d'honneur*, and then proceeded to the inaugural meeting in the hall belonging to the Royal Society of Harmony, where several questions were discussed. Without attempting to give an account of the proceedings, which lasted a week, we may usefully jot down a few particulars. America, Belgium, the Brazils, Denmark, England, France, Germany, Holland, Italy, Russia, Spain, Switzerland, Sweden, and Turkey were represented. Amongst those who attended from England were Mr. Pollen, M.A. (of South Kensington Museum), Mr. C. Wykeham Martin, M.P., vice-president of the Society of Antiquaries, Mr. Lewis Pocock, F.S.A., and Mr. J. H. Parker, F.S.A. In the Archæological Section, on the 26th, M. de Caumont presiding, Mr. Worsaae, inspector-general of Danish monuments, delivered an interesting discourse on the monuments of the age of Stone, the age of Bronze, and the age of Iron, in the North. As these grand phases of the history of humanity have occupied thousands of years (at any rate, the two first), they had established, he said, in Denmark, sub-divisions. In the two divisions of the Stone age the works of the second were superior to those of the first; but of the two divisions of the age of Bronze, the works belonging to the first were better made than those of the second. He was unable to give the date at which these different periods commenced. They never found stone implements in monuments of the Iron age. Mr. Worsaae described some of the recent discoveries in Denmark, especially in the peat bogs, and an animated discussion ensued.

On the question whether what was known of the Dolmens of Ireland and Scotland (in Scotland, by the way, there are very few) interfered with the conclusions arrived at by the French antiquaries as to those of Brittany and Normandy, the meeting appeared to be unanimously of opinion that they were all of the same epoch, and agreed in all points.

The age of tombs of lead, and the position of the study of Runic inscriptions, were amongst the other subjects discussed.

In the Historical Section, Mr. Wykeham Martin, president, the place of birth of Peter Paul Rubens was the first subject treated of. All that appears clear at present is, that he was not born in Antwerp, as is usually asserted. Even the name of his mother is doubtful, some asserting that he was an illegitimate child taken charge of by the wife of his father!

An attempt to determine the influence exercised by Greece and Etruria on the development of the arts and sciences in primitive Rome, led to a long discussion; but the illustrations given were too few to have weight.

On the 27th the Archæological Section returned to Runic inscriptions,—Mr. Zesterman, of Germany, speaking learnedly,—and to the consideration of the Stone period. Afterwards M. Colfs spoke at some length on the question—"Were the forms of Greek Temple-architecture borrowed from constructions in wood?" discussing the opinion of M. Viollet-le-Duc, who thinks they were not. The speaker urged that M. Le-Duc had not gone back far enough in his researches for the origin of the Greek Temple, and gave reasons for taking the affirmative side of the question. He ended with some remarks on the changes and mystifications that have been introduced into the writings of Vitruvius by editors and translators, and said that what Vitruvius wrote of the Greek Temple had been confounded with the Doric of the Romans. To study Vitruvius usefully, it was necessary to consult at the same time drawings and profiles of the ancient Doric temple, and to get rid of the greater part of the illustrations which had been added by others to his works. M. Colfs's address was printed.

In the Historical Section, on the same day, Mr. Wykeham Martin gave some particulars of what had been done in England for the preservation of our archives, which remain unbroken from the time of Edward I., many dating from William the Conqueror. The documents are joined together to form a band of considerable length, which is rolled on a cylinder. There is an inventory of them, giving a summary of each document, and an index points out the names cited in the documents, and the page of the inventory where the summary will be found. M. Advielle said the arrangement in France was better. Inventories were printed and issued by the Government: the collection already comprised 1,500 volumes. The departmental archives were in two classes,—the historical, and those posterior to the Revolution. The first were nearly all classified; the latter only imperfectly.

Particulars were given of the archives of other countries. In the course of the discussion it was stated that the designs of the departmental architects in France charged with the restoration of churches, also the designs made by the Corps des Ponts et Chaussées, were not properly preserved.

The Archæological Section, on the 28th, occupied itself wholly with architectural subjects. The question how to determine the character of Carlovingian Architecture and its influence on the art of building, and the influence of the Normans upon that art after the time of Charlemagne, was discussed at some length, the Baron de Quast, president, and others, describing various early buildings, and seeking to arrive at features peculiar to the earlier periods. Then came the question, "Is the Pointed style to be considered the natural and complete development of the Romanesque?" M. de Caumont and M. le Maistre d'Antaing pointed to buildings wherein the transition was seen.

Mr. Parker said the transition occurred not in one building, but all. What they wanted was to know precisely the date of each monument. It was in Anjou and in England that the real origin of the Pointed style was to be found. The change in the ornamentation took place before the change in the style. The Pointed style could not be dated earlier than the end of the twelfth century: before that it was Transitional. Each country had its peculiarity; every abbey had its school of workmen, and each was striving to surpass the others. The first monument in the Pointed style was the Cathedral of Lincoln, built from the year 1192 to 1200. There was no other so ancient.

In the Historical Section the position of the art of glass-painting excited considerable interest. The heading in the programme was,—"Describe the processes employed in the Middle Ages for the manufacture of painted glass, and point out the ancient *ateliers* most renowned for its fabrication." Mr. O'Kelly contended that the ancient processes were unknown to us. As to schools, we had none. M. Pecher, of Tournay, said, if we failed in obtaining satisfactory results, it was because the manufacture of glass was bad. By the old glass, the rays of the sun were decomposed, and effects were produced that we could not equal. Formerly the glass-painters made the glass themselves; now they were obliged to trust to manufacturers, who supplied glass that was too translucent. Baron de Quast said, in Germany they had had *ateliers* very renowned, especially in Bavaria, from the tenth century. In the Cathedral of Augsbourg there were remarkable painted windows, but of which the date was unknown. The constant re-appearance of the same details showed that there were but a few centres from which the artists transported themselves from place to place. M. Dognée observed that, in Belgium, France, and England there were manufactories of stained glass according to the ancient processes: these had never been lost, though in consequence of difference in materials there was a certain difference of colour. In Switzerland they used double glass to obtain the degree of opacity desired. M. Bordeaux said the Paris Exposition showed the condition of mediocrity into which glass-painting had fallen. As a rule, modern glass-paintings were below the level of contemporary arts. Some modern windows, not twenty years old, were already deteriorated. The fabrication of painted windows was to-day a mere matter of trade, and price was considered rather than goodness. The Abbé Sauvage replied, that was true; nevertheless there were good and conscientious artists to be found who produced solid and artistic works. The art was not lost any more than was the art of the worker in bronze. Other speakers urged that if the builders of churches would exercise more discretion in their choice of artists, and would pay more, they might obtain better windows. The race of men of talent was not yet lost.

In the course of the sitting on the 29th Mr. Pollen described to the meeting the Universal Catalogue of Works of Art proposed to be produced by the Department of Science and Art. The letters A and B are nearly complete, and the speaker sought the aid of the learned in all countries to supply omissions and rectify errors. The announcement of this work was received with great applause.

A discussion of the right of the Van Eycks to be considered the inventors of painting brought out some interesting particulars of Roger Van der Weyden and the Tournay school of painting. The great influence of the Flemish artists at that period was made evident.

Amongst several interesting subjects discussed on the 31st was this,—What are the principles that should be followed in the restoration of an ancient monument constructed at successive epochs, and in different styles? M. Colfs contended, in a memoir he had prepared, that the course to be pursued was to bring back the building to the primitive conception; or, if that could not be done, to give the preference to the dominant style, and restore the building in accordance with that! For example, he said, if I have to restore a building constructed two-thirds in the Romanesque style, and one-third in the Pointed style, I apply myself to suppress the one-third of Pointed (we are using the speaker's own words), so as to present after

restoration, a pure style! M. Bordeaux energetically combated this destructive view: in thus pretending to produce unity works of the highest interest would be destroyed. Baron de Quast took the same view, and mentioned some very bad cases of injudicious restoration in Belgium; and ultimately, on the motion of M. Genard, the meeting came to a Resolution, that in the restoration of ancient monuments each part of the building should be repaired and conserved in the special style in which it was built, and with the character which was proper to it. Colonel Meyers called upon the members present to pledge themselves to assist in bringing about the reconstruction of the ancient Bourse of Antwerp, important from both an architectural and artistic point of view, and this they did with loud expressions of accord. But we may not give more space to these proceedings. We can only add that many of the delegates and visitors, particularly the English, were much indebted to Mr. Grattan—our consul—for great kindness and attention. The Baron Nottebohm, the Danish consul, gave the members a splendid banquet at his country residence. The President of the Académie d'Archéologie de Belgique, and the Bourgmestre de la Ville d'Anvers, entertained them; the former in the Grand Hall of Harmony, where the Congress held its sittings; and the latter at his private residence. Concerts, to which they were all invited, were held every evening, and endeavours were made in all quarters to render the visit agreeable as well as instructive.

THE PARADE GROUND AND THE SPADE.

THE readers of that great novelist who has had no successor, will not have forgotten the characteristic scene in which the extremely respectable clerk of a London merchant finds himself, with no less surprise than discomfiture, the inmate of a Scottish prison. Under all the embarrassing novelty of the position the precise habits of the counting-house assert the force of a second nature; and when a small sum in addition is required in order to simplify matters, the drawing of the line beneath the two numbers that are to be cast is as duly and accurately performed as in the sacred columns of the ledger itself. Those of our readers who learned arithmetic from the pages of "Bonnycastle," may yet realise the mingled feelings of wonder, suspicion, and disgust with which the ancient systematic teachers of the mysteries of "sums" and of cyphering, first beheld men like Augustus De Morgan run up five columns of figures at a time, one for each digit, and give an accurate result before on the old method one would have done more than set down nought and carry one.

The total change in method of thought which is illustrated by such a contrast pervades every branch of social activity. It is probable that no preceding century, taken as a whole, has witnessed so much change in men's minds and in ordinary habit as has taken place within the last thirty or forty years. In the great centres of population the change is, of course, most apparent, but even in the remotest rural districts the same influence is traceable. The red cloaks of the peasant women, which transformed the Welsh farmers' wives into regular troops in the apprehension of the French invaders of Fishguard at the close of the last century, have now altogether disappeared. We look in vain for the habitual dress of the ploughboy of forty years past, the "smock-frock" that had come down to him from Saxon England. Those anti-social cages of steel ribbons, absurdly known by the name of crinolines, have invaded the remotest rural districts under various forms of ingenious discomfort and ugliness, and the village children are becoming far too cosmopolitan to greet a decent stranger by a bob at the forelock.

The *laudator temporis acti* who, while refusing to travel, has found the England of the eighteenth century to be travelling far from his disappointed and lingering vision, has been long wont to console himself for hateful innovations by a glance at those institutions for which he pays the most. "Thank God," was a memorable ejaculation, "we have a House of Lords." "Thank God," it is now more appropriate to remark, "we have the traditions of the service and the regulations of the army." As to the navy we have less consolation. Nor even is the contemplation of the army a subject of unmingled self gratulation. If we look at Hogarth's "March to Finchley," we shall find that the uniform of the British soldier, though still proudly distinguished by the apoplectic stock, the compulsory use of the distinctive tattoo of the razor, and the white cross-belts that answer the double purpose of contracting the chest and furnishing an admirable bull's-eye for the enemy, has undergone considerable change since "George the Third was King." Especially have we made so great a stride in the introduction of the formidable artillery which has given a just fame to Sir W. Armstrong, that we are likely steadily to refuse to consider any further evidence on so noisy a subject for another official generation. But in the navy the new element has made wild work with the venerable traditions of the past. The floating castles which, twenty-five years since, were regarded as chief among the wonders of human handiwork, are now looked on as so many arks, and instead of relying on our wooden walls we are girding ourselves round with walls of iron.

There has, however, always been one essential difference between our land and our sea services,—a difference inherent in their nature, and to which the popularity of the naval officer may in great part be attributed. Preparation for defence is of the essence of all military order; but the preparation which is requisite in an inland garrison, in the native country of the troops, and in a time of profound peace, is apt to sink into a matter of formalism and routine,—of stocks and pipeclay. On board ship it is otherwise. An enemy may be at any moment alongside,—not an enemy who will rush up the ropes with cutlass and marling-spike, but one who may lay the vessel itself on its broadside with a lurch, or pour with irresistible force through the unclosed port-holes. The winds and waves of our stormy seas have been since the time of the Armada, to say nothing of earlier history, at once the best guardians of our freedom and the best educators of our adventurous youth. A squall may come on at any time, and for two or three days out of every week the energetic activity of the sailor may expect to be tested in a manner calculated not only to keep him alert, but to call for and to develop his bodily strength. Thus, while the professional activity of the soldier can only be exercised by conventional appeals to his duty in time of peace, the professional activity of the sailor is ever on the alert. The grand object to be dominated by the navy is the sea, and hostile vessels come in only as a portion of that great host of difficulties over which we expect the "meteor flag" to triumph. A ready aptitude for whatever may occur thus comes to form a portion of the sailor's character. Jack is at home, proverbially so, under all circumstances. A party of English sailors were amusing themselves in the streets of Naples by experiments in horsemanship, or in whatever may be the proper term to use when the animal mounted was of the humbler rank of an ass. Not relishing the vigorous thumps administered by his rider, the first animal of the cavalcade executed so successful a kick as to send Jack flying clean over his head. The sailor alighted on his hands, and ran briskly forward in that inverted posture as if it had been perfectly natural for him to go along with his heels in the air. This was only a trivial illustration of the manner in which the education of rough weather makes the sailor instantly at home under the most novel circumstances.

With this difference between the nature of the emergencies peculiar to the land and sea services, it naturally occurs that a review by land differs from one by sea in everything but in name. A naval review is always a bit of actual service. The wind will not come to order. The handling of vessels, even under steam, is a real bit of work. The military review, on the other hand, especially the military review of the earlier part of the century, served to bring into strong relief the difference in the meaning of the adjectives "military" and "warlike." The affair was merely a parade on a large scale,—a matter of buttons and well-brushed coats, of promptitude in the manipulation of the fire-arm, and of mechanical exactitude in marching and wheeling. The length of the pig-tail is no longer an item requiring exact admeasurement; but the pig-tail school is not extinct among our older officers. We do not wish to speak with any disrespect of the unrivalled steadiness of the British march, the firm, united, unbroken tread, as unshaken under fire as in the parade, which excites the admiration even of soldiers formed under the most opposite systems of drill. But it is more than questionable how far the slow march is in arrear of the *Annus Domini*. The most brilliant courage, the most perfect *sang froid* under fire, prove no protection against the rifle. That part of the military code which most wisely and justly sentences officers to punishment for undue exposure of their lives in presence of the enemy, demands a fuller extension. So long as it took a hundred and fifty shots to produce a wound, coolness and unwavering discipline won the day. It was by these reliable qualities in the British soldier that the greatest captain of the present century won its most decisive battle. He calculated that his troops would keep their ground to the last man, and that the expenditure of life before French cannon and musketry could not reach the last man before the arrival of Blucher or of nightfall. But if both armies had been provided with breech-loading small-arms and with rifled cannon Waterloo could not have been fought as it actually was fought. What changes the Great Duke would have made in his dispositions we have not the advantage of learning from his genius or from that of his colossal opponent; but we may yet derive a lesson from the grave of Wellington. Eminently, while on active service, the duke was a practical man. It was his habit to weigh possibilities, to seize first the leading features of the position, to leave as little as possible to luck, and to make the main chance secure. It was thus that he prepared his famous lines of defence in Portugal, and at a time when actual fighting formed more of the business of war than it does at the present day, gave the first important check to the combinations of Bonaparte, not by the bayonet so much as by the spade.

We cannot doubt that if a soldier such as was Wellington in his prime were now at the head of the British army the importance of the spade in all future warfare would be brought out into strong relief. With the increased precision of aim and rapidity of fire of modern arms a battle becomes more a question of time than was formerly the case. The defence involves endurance more than courage. Let troops be kept on an exposed position for so many minutes, and they will be mown down to a man. In all the great battles of modern times, the seizure of some partially covered position has usually been the object of the most obstinate struggle. This feature of war remains unchanged, unless by the increased rapidity with which the torrents of blood will flow around the post that is selected as the key of the position. But in the occupation of open positions, which dominate the field, but which are now exposed, as was not the case formerly, to the fire of rifled shell and shot, will be found the main difference in the features of modern battles. Points of command essential to the tactical movement of the hour will be tenable only for so many minutes, because in so many minutes every soldier thus exposed will be shot. It is obvious that the resource in this emergency is the spade. The art of self-defence must, as in the Spartan times, be made the first duty of the soldier. To stand to be shot may be magnificent, but it is not warlike. We must learn to stigmatise it as unmilitary. The general who can most rapidly intrench his troops will remain master of the field. We do not speak of the painful and elaborate system of entrenchment which was practised in the American civil war, although it was the spade which enabled General Lee so long to hold his own against forces so immeasurably out-numbering his battalions. But a rapid mode of throwing up a blind against riflemen, a familiarity with the pick and shovel, such as make our "navvies" as adroit as so many moles, is as essential to the safety of the troops, and ought to form as integral a portion of the military education of the infantry as the use of the rifle itself.

The subject has been formally brought under the notice of the Horse Guards, and of course with the usual result. The first objection made is, that the soldier is unaccustomed to handle the spade, and that an addition to his drill of a severe form of manual labour will render the service unpopular, and interfere with recruiting. Tell him that it is for his own protection that he is thus called on to instruct himself, and his reply will be,—to decline to enlist.

To this objection there is one complete reply. The soldier must have extra pay for extra labour. This can be effected, not only without addition to the army estimates, but in a manner that would become popular both among officers and men, by affording a rate of pay very far in advance of the military rate, on a self-supporting basis. Our navigators readily earn their 5*s.* and 6*s.* a day. The education of a navigator consists

in putting a spade into his hand, and telling him to fill so many barrows of earth a day. At first he does it very badly; he works slowly and clumsily; he does less than half as much as his neighbour, and he is tired to death by sunset. A week or two of practice makes an immense difference; in three months a pick may be put into his hand; in six months he is a skilled earth workman; in twelve he is fit to be a ganger.

Now, if working parties of troops were detailed for the execution of civil or military works, commencing under the guidance of picked civil workmen, who would soon be replaced by non-commissioned officers, very little time would pass before the military excavators became as skilled as the civil. If a preliminary outlay seem requisite for clothes and tools, this outlay would be replaced long before the close of the year, and the proper price of the work done would be such as most amply to remunerate all engaged. We speak from large experience of civil works, and we can appeal to the testimony of engineer officers, who know the inefficiency of recruits at any skilled work, and who also know the rapidity with which efficiency is attained under instruction and practice. We do not say to what extent the army might thus, while increasing tenfold its military or rather its warlike efficiency, be rendered a self-supporting institution, but we are confident that the suggestion merited a better reception than the reply from the Horse Guards, that the plan was deserving of attention, but that we have *too few men in the army* to allow of its adoption. It is this very scarcity of our precious *personnel* of war that will, sooner or later, (let us hope before some great affront has demonstrated its necessity,) render the adoption of some such plan an essential part of our military system.

CONCERNING THE BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, AT DUNDEE.

THE meeting at Dundee has been more successful than at first seemed probable. The proceedings in the sections were, as they always are, interesting; the hospitality connected with the excursions was gratifying to all who took part in them; whilst, notwithstanding many well-known faces were absent from Dundee, the tickets issued and the amount realized at the meeting were beyond the figures at Nottingham. Moreover, the city-authorities did so much during the week, as to remove to a considerable extent impressions that were produced on visitors from London, on their arrival, or by the first twenty-four hours' residence. The Provost himself was indefatigable; and one, or perhaps two of the three local secretaries, soon after our notice of last week was written, came out into the light: to Mr. Henderson at least, we are indebted. More might have been done, it is admitted, as to the arrangements of the opening-day; but we are assured that any omissions were owing to the unsuggestiveness of those who alone know—the general and assistant secretaries of the Association—what is required in details, from having had experience, or at least ought to know. When the Association goes, next year, as is decided, to Norwich, there must be some arrangement by which lodgings may be kept within reasonable limits of price, and by which persons employed by the local secretaries to ascertain available accommodation may not apparently play into the hands of those letting the lodgings, as to the terms, and may eschew altogether the dirtier quarters of a town, and do something towards preventing the proprietors of taverns and the purveyors of refreshments from becoming every day more extortionate. The list of lodgings at Dundee was worse than useless: inquirers were directed by it to places that could not be found, and to one place that was a cellar. The lodgings, when found, were from 30s. to 3l. 10s. per week, for two small rooms; and of what we saw, the more expensive were the least cleanly. As it was, effects of some of the preliminary arrangements, and the original defects of the places of residence, remained, or were operative to the last. The majority of the tenements in Bonnie Dundee have certain deficiencies that would prevent persons from the south of the kingdom from settling in the city, whatever otherwise the inducements. Excepting in hotels and public institutions, and in houses built by the more wealthy people for their own residence, one requisite seems to be always unprovided in the plan, and non-existent in fact. A certain odour, not that of sanctity, or else a smell of burnt lavender as a substitute provided and preferable, is apt to be met with. On the first morning a general chorus of complaint was sounded in the reception-room in the Exchange buildings; which apartment, by the way, soon became almost unbearable, from the demand upon certain accessories of the building that have been alluded to as wanting elsewhere. The system of residences in flats is very general; and, of course, this has the advantages which our readers are well aware of. The "stair," in such cases, usually ascends direct from near the street entrance-doorway, to which last there is no door. The consequences, in many cases, need not be mentioned; and should there be nothing more objectionable, and the stone steps be scrupulously clean to the eye, there is stench that is disgusting, due to the fact that the population of the tenements is largely feline. We may say that the flea of this part of Scotland is of a bigness and an agility unknown in the southern part of the island; that is to say, if we may bear witness to the zoological fact after sleepless nights, and succeeding days of discomfort like that which was the lot of the carriers in Shakspeare's "Henry IV." As regards the worst defects, alluded to, of the dwellings, the authorities of the city are no doubt anxious to correct them. Sewerage and water-supply have been attended to: the water moreover seems good. The most-recently built of the tenemented dwellings, as those erected by the Messrs. Baxter, in Lyon-street, of which we may again speak, are very superior to others. We have no doubt of the anxiety of the city-authorities to remedy what is defective; but at present the system of the removal of ordure from the houses is disgusting; albeit as to what comes under the comprehensive designation "dust" in a London-house, we advocate the French system of depositing it in the street, combined with perfect street-cleansing, in lieu of the hoarding it in or close about houses, which is general in London.

Of the city itself much more might be said; but our present business is with the Association.

The opening meeting was held in the Kinnaird Hall, a room built as a Corn Exchange, and for public meetings, and said to be 130 ft. by 60 ft. on the ground, and 40 ft. in height, and estimated as affording space, with its end-gallery, for from 2,500 to 3,000 persons. On this occasion there were side-galleries, temporarily erected. The ceiling has sloping sides and a central plafond, and is carried by iron ribs of the semi-circular-arch form: the lighting, by day, is through the sloping sides. By night the arrangement provides for sun-burners; but on the evening in question, gaseliers were substituted, and the room was almost unbearable. Before the proceedings commenced Sir David Brewster fainted, and had to be carried out. The original sun-burners have now taken the place of some of the gaseliers, and with advantage; but on each of the lecture-nights the room has been still hot and uncomfortable.

The chair was taken, in the absence of Mr. Grove, the former president, by Sir Roderick Murchison, who, with questionable taste, said that the choice of president this year had been made on the principle of alternating men of rank with men of science. The address of the Duke of Buccleuch, which followed, was an argumentative exposition of the advantages of science, and of the importance of its being taught in schools and universities; and anywhere else than at the British Association for the Advancement of Science, would have been highly creditable to the person who delivered it. It resembled in no respect the addresses of former years in being a review of the scientific progress of the year. Therefore, it seems to us that the Association this year will have failed of one of its most important functions. The duke said, he had never in his life attempted to pen, beforehand, a speech or address to be delivered, and that in this case he must have had recourse to the pens and to the heads of others, whilst he preferred speaking from his own heart and head. There is much in this that is creditable to the duke; but the man who is not capable of utilizing the labours of others, whilst acknowledging them, and of making his own individuality, as well as acquaintance, to some extent, with every branch of science, clear at the same time, is not fitted for the post of president of the Association.

There is frequent error, in several ways, in the practice of men in such a position as that of the president of the British Association, men of science or others. Whilst not forgetting that there is no natural demarcation of branches of science, distinguishing them from other branches, they assume that an individual mind is held, by the public, capable of grasping the whole. It would be far better,—indeed it is essential for the annual address at the meeting of the British Association,—that the utmost use should be made of the assistance of the man most competent in his department, and that such assistance should be openly acknowledged. This was the course pursued by the great Humboldt in his *Cosmos*. Lord Brougham, although there is no doubt of the writership of his addresses on subjects which were all taken in by his comprehensive mind, was accustomed for many years to be kept up with the progress of different branches of science by chosen persons regularly attending him with the object. In each of these courses there is recognised that for which we contend. If the proper man be chosen for the presidency, the address will be that of the individual, none the less that all requisite assistance is both used and acknowledged, whilst it will be, what the address this year was not, a report of the state of each science and of the existing relations in the whole.

We should mention that at the meeting of the General Committee, in the morning, a very important report from a committee was read, on Scientific Education in Schools. It is too long for our reference to more than one or two of the many important points in it. It showed that those boys upon whom the ordinary school education produced slight effect could be stimulated by instruction in science, and that science would be found a most valuable element in the education of those who showed aptitude for literature. It referred to the opinion as concurred in by schoolmasters, that much more knowledge and intellectual vigour might be obtained by most boys during the many years they spend at school, than what they do obtain. So far from the valuable results of a classical education being diminished, the report maintained that the exclusively classical education failed deplorably for the majority of minds. The report said: "As a general rule, the small proportion of boys who leave our schools for the Universities consists undeniably of those who have advanced furthest in classical studies, and judging the existing system of education by these boys alone, we have to confess that it frequently ends in astonishing ignorance." As to the notion of excessive strain upon the minds of boys, the report alluded to the same objections as once opposed to the introduction of modern languages and mathematics; and it remarked that change involving play of a new set of faculties often produced a sense of positive relief. A distinction is made in the report between scientific *information* and scientific *training*. Both of these should co-exist in a school professing to offer the highest liberal education; whilst at *every* school there should be comprehensive elementary instruction in science. But the report clearly contemplates much more than the merely elementary instruction. It considers the claims of experimental physics, chemistry, and botany, and says of chemistry that pursuit of this science "affords a corrective of each of the two extremes against which real educators of youth are constantly struggling." For, on the one hand it leads even sluggish or uncultivated minds from simple and interesting observations to general ideas and conclusions, and gives them a taste of intellectual enjoyment and a desire for learning. On the other hand, it checks over-confidence in mere reasoning, and shows the way in which valid extensions of our ideas grow out of a series of more and more rational and accurate observations of external nature." Further on in the report, reference is made to the fact that many boys of thirteen or fourteen are sent to the public schools almost totally ignorant of the elements of arithmetic. With a view to the furtherance of the objects, the following suggestions are made:—

I. That in all schools natural science be one of the subjects to be taught, and that in every public school at least one natural-science master be appointed for the purpose.

II. That at least three hours a week be devoted to such scientific instruction.

III. That natural science should be placed on an equal footing with mathematics and modern languages in effecting promotions, and in winning honours and prizes.

IV. That some knowledge in arithmetic should be required for admission into all public schools.

V. That the Universities and Colleges be invited to assist in the introduction of scientific education, by making natural science a subject of examination, either

at matriculation, or at an early period of a University career.

VI. That the importance of appointing lecturers in science, and offering entrance scholarships, exhibitions, and fellowships for the encouragement of scientific attainments be represented to the authorities of the Colleges.

With reference to the last two recommendations, co-operation of the Universities is necessary, although not more than 35 per cent. even of the boys at the great public schools proceed to the University, because the curriculum of a public school is almost exclusively prepared with reference to the Universities. Attached to the report are Appendices, giving particulars of the scientific education within the present sphere of the Universities, including London, and of the College of Preceptors, and also particulars of what is done in the French and German schools, as well as ample information as to the teaching of science at Rugby and Harrow.

On the following day the sections got to work. Some of the papers which were read on subjects directly interesting to our readers we shall print or refer to.

Besides the proceedings in the Sections, there were two lectures to large audiences in the Kinnaird Hall, one of them by Mr. Archibald Geikie, on "The Geology of Scotland with Relation to the Picturesque Features of the Country;" and the other by Professor Alexander Herschell, F.R.A.S., on "Meteors and Meteorites." Each of these lectures was illustrated by large diagrams and views, and the latter one by some very remarkable experiments. On two other evenings there were *soirées* in the Volunteer Drill Hall; which were attended each by upwards of 2,000 persons. The only defects in the arrangements were insufficient width of entrance-and-exit-way, and very inadequate provision for overcoats and umbrellas. This drill-shed is a large structure, of the railway-shed character, as built, but which on this occasion was made to assume a highly-effective appearance. It was erected partly for the purpose to which it was applied during the meetings of the British Association, and partly for that which its name indicates. There seems to be some idea of making the structure eventually, longer than it now is.

On the nights of the *soirées*, the entrance where carriages set down was approached by crossing a forecourt, ornamented with plants and coloured lamps; and across the whole end of the building ran a temporarily-erected porch, glass-roofed, and decorative in appearance. Double flights of steps were in the centre; whilst other flights of steps at the ends of the loggia, were reserved for pedestrians. The walls of this hall were covered with paintings, about six hundred in number, some of them copies of old masters, though not always acknowledged to be such, but many of them works of the highest order of excellence; and many interesting objects were dispersed about the ample area of the hall. After one of the *soirées*, there was a ball in the Kinnaird Hall. There was an agricultural show; there was a flower-show in the Baxter Park; and there were numerous places of interest thrown open for the inspection of visitors. On the Saturday there were excursions to St. Andrew's, to Rossie Priory and Fingask Castle, to Falkland Palace, and to Glamis. Eight or ten others were to be made this Thursday. On each day, each one of the excursions offered such temptations, that scarcely a member of the Association was there who did not regret his or her inability to go to all. A comparison of notes on Saturday night showed that every one had been gratified.

The more formal business of the Association concluded on Wednesday.

COST OF THE NEW VESTRY-HALL, ST. LUKE'S. In accordance with a request of the vestry, the clerk has laid before the Board a detailed account of the money expended in the erection of the new Vestry-hall. It contains the following, with other items:—Cost of site, 1,650*l.*; building, 6,416*l.* 2s. 10d.; expended at the laying of the foundation stone, 70*l.*: Mr. Stett, for first drawing, 365*l.* 5s.; for second ditto, 279*l.* 6s. 1d.; some additional painting, 10*l.* 15s. 9d.; carpenters' work, exclusive of the building contract, two items, of 10*l.* 15s. 2d. and 145*l.* 14s. 6d.; gas-fittings, Mr. Jeal, 247*l.* 7s.; a marble slab, 43*l.* 9s. 4d. The total was 10,272*l.* 19s. 3d. The clerk said the guardians had to pay half of that amount, namely, 5,136*l.* 9s. 8d. That body had already paid 1,650*l.* for the site, and 3,000*l.* cash.

VENTILATION.

THE Drummond School was opened in May, 1864, for the reception and education of orphan daughters of soldiers.* Thirty children, the youngest of seven years, were selected, medically inspected, and admitted within the next few months, and a female staff placed in charge of them.

Not very long after the entire number of children was assembled, slight ailings occurred, which were attributed to change of climate and diet, and other ordinary causes; but this conclusion was in time discovered to be inexact, as these tendencies did not pass away with longer residence, and ordinary health was not in all cases resumed. These illnesses were in themselves, with one or two exceptions, unimportant, except from indicating that something was amiss in the sanitary conditions of the school: they comprised sick headaches, deranged *primæ viæ*, sore throats, sore eyes, glandular enlargements, colds, feverish attacks. One girl was removed with incipient lateral curvature, another died from gastro-biliary fever, which rapidly assumed a very low type; and, lastly, porrigo showed itself. No exception could apparently be taken to the mansion; it was situated in a most healthy position, the rooms were of good size and airy, and in the dormitories the beds were so arranged as to be one yard apart. Ventilators likewise had been introduced into the walls of the school, and other rooms, under the direction of Col. Durnford, of the Royal Engineers; and in fine weather the windows were kept partially open, and everything done to keep the house sweet.

In August, 1866, the governors at my request sanctioned the ventilation of the sleeping apartments in the manner I am about to describe.

Since then, that is during the last year, a most gratifying change has taken place; only two cases have been presented to me for treatment, one of acute dyspepsia after the Christmas holidays; another of scarlet fever, which ran a very mild course after the Easter holidays.

This result, both novel and striking, can be attributed to no other cause than the thorough ventilation of the above-mentioned rooms, which was carried out by a most competent officer, Mr. Daly, of the Royal Engineer Department.

The removal of impure air from a room can be effected by offering to it a ready outlet and dynamically replacing it with pure air; the problem to be solved is how to compass this object without creating a draught, which may be detrimental to health, or which shall interfere with the personal comfort of the inmates. I do not know that there is any novelty in the mode adopted at the Drummond School, but a little care is required to secure all the objects contemplated and in the best way.

Each room was ventilated quite independently of its neighbours. From such room holes or perforations were made, exactly opposite to each other, close up to the ceiling, through walls and partition walls, right through to the open air in front and rear of the building: into these perforations tubes or conduits were inserted which passed from the room completely to the outside of the building. Some of these tubes were, of course, very short, as they had only to clear the thickness of the outside wall: those opposed to them, proceeding from the other side of the room, were long, as they had to extend through the partition walls, from the inside of the room, close to the ceilings of the interposed passages and rooms, until the outside of the building was reached in the exactly opposite direction. These conduits were 15 in. by 4 in. in the clear: the wider and shallower they are the better, so that the section do not much exceed 60 square inches, lest the change of air in the room in windy weather be too rapid. They were made of well-seasoned yellow pine, ploughed and tongued, and the joints put together with white lead, so as to be perfectly air-tight.†

Outside the house the inlets or outlets, as the case may be, of these tubes or conduits were furnished with perforated iron gratings, the perforations being ½ in. diameter and ⅝ in. apart; the holes were punched, "not drilled," the face of the plate with the "burrs" or projections made by the punching being kept on the outside, whereby wet blown against the front of it is prevented running into the tube through the holes: the gratings were $\frac{5}{16}$ in. thick. On the inner side, opening into the rooms, perforated zinc, with holes ½ in. diameter, are fixed fair with the face of the walls, and draught-boards, which experience has shown should be perfectly horizontal, 2 in. or 3 in. wider than the zinc plate, and project into the room about 10 in., are fixed under the apertures, to guide the air into the room, direct it across the room to the opposite aperture, and prevent its descending immediately on introduction. This draught-board performs an important office and cannot be dispensed with. These ventilating apertures, with their special conduits, should be from 15 ft. to 18 ft. apart, so that two sets will fully ventilate a tolerably large room. It is not necessary, excepting for about 18 in. of the part directly entering or leaving the room, that these long tubes should be perfectly straight; they can without detriment take a little excursion, so as to clear a staircase or inconveniently obtruding partition-wall; but the less friction to the air that is permitted within them the better.

Most people have a vague notion that, heated air expanding and ascending, all that is necessary to provide for ventilation is to favour the escape of impure heated air at the top of the room and to permit the entrance of a cooler stratum of pure air below: no doubt pure dry air would be obedient to this law, but the air in a room may be in conditions in which the interchange may be interrupted, nay entirely arrested, unless the difference of temperature be very high,—high to a degree that should never be permitted, so high indeed that it may prove exceedingly prejudicial to health.

My attention was first drawn to this deviation from received principles, many years ago, in the East. I was, late one night, during the prevalence of cholera, called to visit some soldiers of the 95th regiment, in a large, lofty barrack-room: the floor area, however, allotted to the men was so restricted that the soldiers' beds were all but touching. As the corporal moved forward with the lantern, I observed that the flame became small and red; but when he, by my directions, raised the lantern above his head, the flame resumed its ordinary appearance. I moved gently to an undisturbed part of the room, and found on raising myself a foot or two that the air above was tranquil and comparatively pure; but, lowering my head to a level with the men's bodies, I felt it to be oppressive, tainted, and sickening. The presence of this bank of ungenial air enshrouding the men I attributed at the moment to the presence of watery vapour, the *halitus* from their breath and transpiration from their bodies. All who have observed on a damp morning in some manufacturing town the heated air and smoke arrested in its upward movement, and hanging like a cap over the huge factory chimney, will realize the idea that suggested itself to my mind as I regarded it.*

There is something very curious in this tendency of air, in the ordinary conditions in which we find it, to arrange itself in strata. In the atmosphere, free as every particle of air is to obey the forces acting on it, to adapt itself as it listeth, we perceive this stratifying disposition in the flat bottoms of cumuli, in the horizontal sheets of stratus,† and cirrho-stratus. In the East, journeying up to the sanitary stations on the hills, we see it in the early mornings as we mount our horses and glance back on our ride of yesterday, in the flat-topped dense fog, which fills the deep valleys rife with malaria, in the

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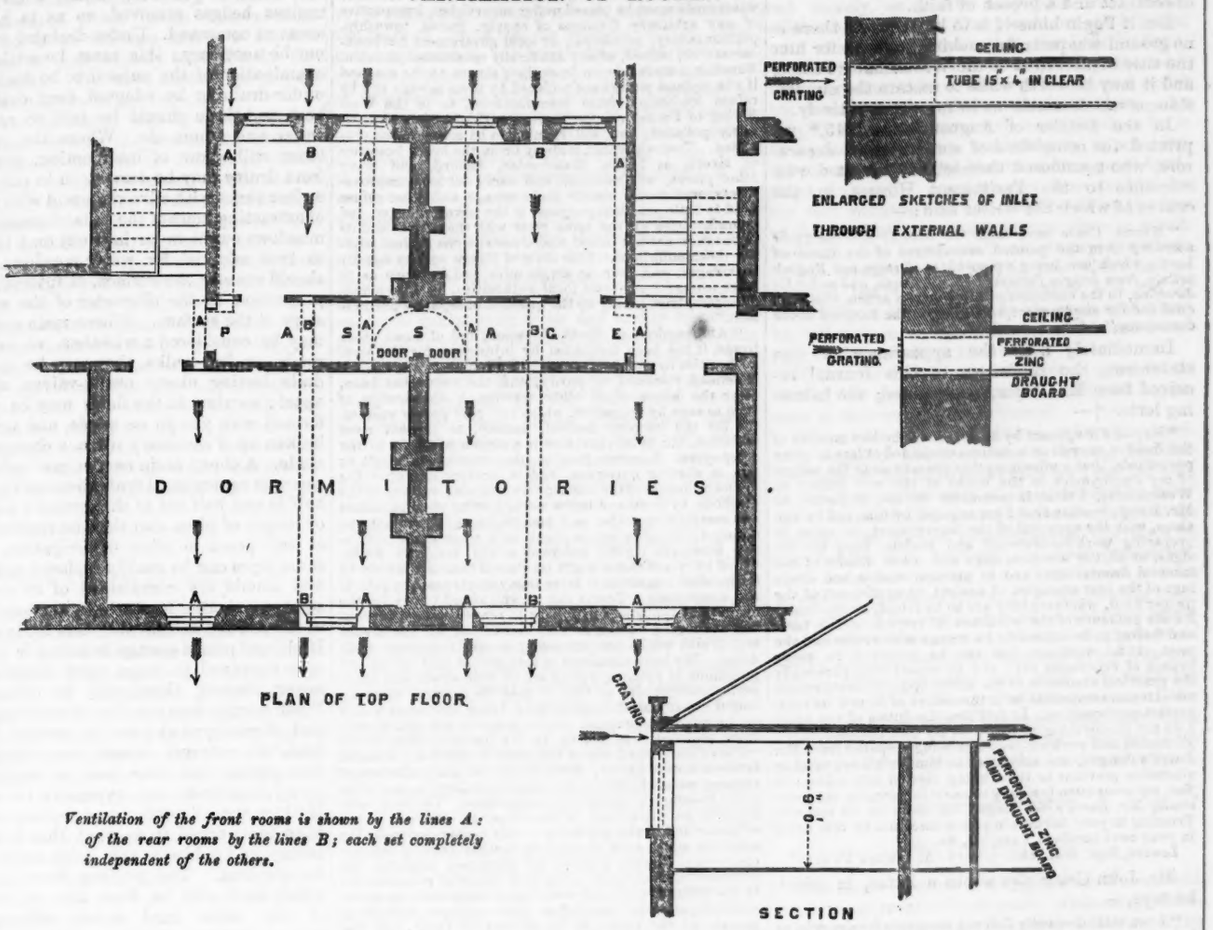
* Mr. Drummond, a merchant of Dublin, who had formerly been in her Majesty's service, bequeathed a sum of 20,000*l.* to establish this school: a further sum of 2,231*l.* was raised by subscription, and expended in purchasing, repairing, and improving two private dwelling-houses (twin houses), situated in a large garden, on an agreeable site overlooking the River Liffey. The interest of Mr. Drummond's magnificent bequest was reserved for the exclusive support and education of the orphan children.

† The recreation-room and dormitories of the Royal Hibernian Military School have been most successfully ventilated in this manner. The conduits are of framework, covered with canvas and deeply coated with paint: they have discharged their office well. Some of the conduits which open into the recreation-room pass over twelve yards through rooms and passages. When the frames of the zinc plates at the inlets were first put up (some years ago) I caused them to be furnished with slides to regulate the quantity of admitted air: these were soon found to be unnecessary, even in the stormy weather of midwinter, and have been withdrawn. In the dormitories, the air of which was formerly much tainted, but now very fair indeed, I have found, after several years' experience, that the minimum space which, consistently with due regard to maintenance of health, can be allotted to each boy is 45 square feet. The average age of these boys is 10 years; a larger apportionment would, therefore, be required for full-grown persons.

* I wrote by the next mail to Sir John Webb, describing what I had witnessed, and pointed out the propriety of securing a greater amount of lateral space to men in barracks. By return mail he informed me that my suggestion would be carried out in a new barrack about to be erected for Artillery at Portsmouth.

† "Meteorology." Sir John Herschel. Pp. 98, 200.

VENTILATION OF ROOMS.


PERFORATED GRATING
CEILING
TUBE 15" × 4" IN CLEAR
ENLARGED SKETCHES OF INLET THROUGH EXTERNAL WALLS
PERFORATED GRATING
CEILING
PERFORATED ZINC
DRAUGHT BOARD
A B A A B A
A P A S A S A A B C E A
DOOR DOOR
D O R M I T O R I E S
A B A A B A
PLAN OF TOP FLOOR
GRATING
PERFORATED ZINC AND DRAUGHT BOARD
9'-0"
SECTION

Ventilation of the front rooms is shown by the lines A: of the rear rooms by the lines B; each set completely independent of the others.

intervals of the mountain spurs."* Mr. Glaisher, in his balloon ascents and descents, is stated to have passed through some 2,000 ft. of air of uniform temperature into other strata indifferently of higher or lower thermal state.* Mr. Clibborn, of the Royal Irish Academy, has favoured me with another singular instance in "a peculiar effect produced in the old library by the mode of heating it under the bookcases with small iron pipes, heated so highly with water that they would char dust and blacken paper sometimes, so that we expected an accident, until I adopted a method of cooling them by means of hundreds of iron saddles made of bits of hoop-iron, a plan which I found wonderfully efficacious in cooling the pipes and heating the air in the room moderately and agreeably, instead of the hot dry air we had previously. Now this air used to accumulate and form a stratum of the height of the long table in the middle of the room, provided the place was still and no one walked about: your head and body would feel cool, but your legs and feet oppressively warm: you would be reading and all quiet, and in a moment the cold air from the great lantern at the top would tumble down, and you would feel a great shock,† as if a blast of cold air struck you from some window or door suddenly opening. At night, on one occasion, when we were at work at the Catalogue, moving very little, having books on the table and eight large candles burning on it, the night being very cold we had the hot-water pipes very warm, when suddenly the cold air fell from the lantern, and the hot air flew up suddenly into its place with such rapidity that all the candles were blown out." Mr. Clibborn likewise observes, that this stratification is by no means absent from private dwelling-houses; the separating plane of the strata being usually on a level with the upper edge of the fireplace.

We thus can readily comprehend that in still rooms, such as they ever are at night, we have no guarantee in loftiness of ceiling for the purity of the air we are breathing. It is, besides, highly objectionable to admit in any great quantity cold air by ventilators at the baseboard of the room; I have had on many occasions to close them up, as I have found coughs, sore throats, and sore eyes clearly traceable to them. In the mode of ventilation I have been describing these untoward results never occur.

In our variable climate it is exceedingly rare to find the air perfectly still. Wind is always being propelled in one direction or another, and never so completely end on to a dwelling-house but that it will sensibly press on either the front or the rear. It will be obvious then, that, no matter how the wind may blow, an unequal pressure will be exerted on one or other face of the house, and that the effort at equilibrium will carry a current through the tubes or conduits from the windy to the lee side, directly across the upper part of the room to be ventilated. The friction of this current on the volume of air in the room very soon sets the mass in gentle motion, revolving on a horizontal axis; part of the introduced air becomes entangled with the revolving mass, and keeps up a supply of pure air to the room; while, in like manner, a portion of the mass disengages itself, and passes out with the current, thus removing a part of the impure air previously circulating in the room.

A little care is required to adapt the average in-flowing current to the size of the room, so that it may not cool the room too palpably. I have adopted a section of 60 square inches in the Drummond School, the ceiling being only 9 ft. from the floor, and with this have had the ventilators open all the last severe winter, and have not found that the temperature was inconveniently lowered, or comfort at all interfered with.

ROBERT TEMPLETON, Dep. Inspector General, Royal Hibernian Military School.

* *Vide* on this subject Prof. Tyndal's charming volume on heat and motion.

† Non-commissioned officers have several times mentioned to me this horrid descending blast through the upright ventilating shafts in the barrack-rooms, but I never thoroughly comprehended the drift of their explanations until these observations of Mr. Clibborn reached me. I may mention that these ventilating shafts with louvre tops have utterly failed in every instance: we had four of them in the Royal Hibernian Military School dormitories, as many in the recreation-room, which never did any good whatever.

THE ARCHITECT OF THE HOUSES OF PARLIAMENT.

BEFORE the claim for Mr. Pugin in this respect had reached its present shape, we said, on receiving an anonymous note from one obviously not personally concerned in the discussion, and possessing no special knowledge of the case, that "persons making this claim (a sort of claim always to be looked at with the greatest suspicion, especially when death has removed the chief person concerned) should refer to the statement made in our pages by Mr. Pugin himself on a similar occasion; to which we could add the recollection of an indignant personal denial by Sir Charles Barry and Mr. Pugin both."* Mr. E. Pugin considered this a personally offensive allusion,† although, in truth, it was meant to apply generally and not to be offensive to any individual.

Our observation, in its general application, we now reiterate. Claims of this kind go to destroy all confidence between principal and assistants, and to lessen the chances of men who, not having work to do themselves, are glad, at certain stages of their career, to sell assistance to those who have. Admit what seems evident, that Pugin was, for a certain time during the progress of the Houses of Parliament, Barry's chief and very valuable assistant. Go even further and say, simply for argument's sake, that he was the designer of the building: he accepted the position for his own purpose, and undertook to

* P. 494, *ante*. † P. 535.

do what he did for a certain remuneration, which he received. To claim for him now something much more than he agreed to receive, is a breach of contract and a breach of faith.

But if Pugin himself is to be believed, there is no ground whatever for seeking to claim for him the title of architect of the Westminster Palace, and it may be worth while to restate the circumstances which enable us to say this positively.

In the *Builder* of August 30th, 1845,* we printed the complaints of some English decorators, who considered themselves ill-treated with reference to the Parliament Houses, in the course of which the writer said:—

"Messrs. Crace have both the honour and the profit accruing from the painted decorations of the House of Lords, which are being executed by foreign and English artists, *from designs furnished by Mr. Pugin, and under his direction*, to the exclusion of the only two artists who were qualified for employment, according to the decision of the committee."

Immediately after the appearance of this statement, the conductor of this Journal received from Mr. Pugin, and printed, the following letter:†—

"Sir,—As it appears by an article in the last number of the *Builder*, as well as in notices contained of late in other periodicals, that a misconception prevails as to the nature of my employment in the works of the new Palace at Westminster, I think it incumbent on me, in justice to Mr. Barry, to state that I am engaged by him, and by him alone, with the approval of the Government, to assist in preparing working-drawings and models, from his designs, of all the wood-carvings and other details of the internal decorations; and to procure models and drawings of the best examples of ancient decorative art of the proper kind, wherever they are to be found, or specimens for the guidance of the workmen in respect of the taste and feeling to be initiated; to engage with artists and the most skilful workmen that can be procured in every branch of decorative art; and to superintend personally the practical execution of the works upon the most economical terms compatible with the nature of it and its most perfect performance. In fulfilling the duties of my office I do not do anything whatever on my own responsibility; all models and working-drawings being prepared from Mr. Barry's designs, and submitted to him for his approval or alteration previous to their being carried into effect: *in fine, my occupation is simply to assist in carrying out practically Mr. Barry's own designs and views in all respects.* Trusting to your fairness in giving insertion to this letter in your next number, I am, sir, &c.

London, Sept. 3rd, 1845. + A. WELBY PUGIN."

Mr. John Crace also wrote a letter, in which he says,—

"I can state distinctly that not one single foreigner is, or has been, engaged upon the decorations of the New House of Lords; that after receiving the sketches from Mr. Barry, I have drawn them out full-size with my own hands, and have entirely directed the execution of them under Mr. Barry's immediate instructions and control."

At the same time Sir Charles, then Mr. Barry, called upon us, and denied emphatically the correctness of the statement that had been made. Amongst other things he said,—we remember it distinctly,—that, to avoid the possibility of such ascription, Mr. Pugin made few drawings, excepting from his, Mr. Barry's, own rough sketches, and none that he (Barry) did not to some extent or other work upon. Mr. Pugin had already said the same thing in his letter, and reiterated it *viva voce* on another occasion. We might extract other evidence from our own pages; we might quote the testimony already given by Mr. Wolfe, Mr. Banks, Mr. Wright, Mr. Ferrey, Mr. Talbot Bury, and others, and examine some of the statements made on the other side; but there is no occasion for it. Mr. Pugin told us himself, distinctly, that he had no right whatever to be considered the architect of the Houses of Parliament, and that his occupation was simply to assist in carrying out Mr. Barry's designs in all respects.

We shall be glad if we hear no more of the claim that has been set up, and we express that hope with equal regard for the fame of Pugin as for the fame of Barry.

THE SEWAGE QUESTION.

ANOTHER Report of the Royal Commissioners, Messrs. Rawlinson, Harrison, and Way, on the rivers Aire and Calder, has been printed. On the general question of the best means of preventing the pollution of rivers, they say in this report,—

"Sewage interception is always practicable. Where it can be applied fresh to the land there is least nuisance and least cost to the ratepayers. Where the solids are extracted by mechanical deposition, there is pecuniary loss on the operation, and running streams receiving the effluent water are still polluted, the pollution being greater as the volume in the stream is relatively small. No arrangements for treating sewage are satisfactory except its direct application to land for agricultural uses.

Our experience of the weakness inherent in unaided and uncontrolled local authorities as at present constituted convinces us that a central board appointed by a State department is necessary to the efficient protection of running waters." "In order to prevent the pollution, and legally control the management of rivers, their basins or watersheds must be placed under supervision, irrespective of any arbitrary divisions of county, parish, township, parliamentary, municipal, or local government Act boundaries; or, indeed, of any artificially established division. Running waters flow on from their source to the sea, and if the upland waters are polluted by town sewage and by refuse discharged from manufactories, as in the West Riding of Yorkshire, the entire length of a river is necessarily polluted, and will require to be conserved or protected. Towns situated midway or on the lower branches of rivers, as Leeds, Manchester, Salford, and many other places, will establish and carry out local improvements, and would clarify their sewage and other refuse fluid to little practical purpose, if the towns, villages, and manufactories on the same river with themselves and its tributaries are not placed under restrictions against sending down pollutions. This state of things applies equally to villages, and even to single mills and factories as to large towns: it prevents local authorities, as also manufacturers, from taking up the question of separate purification."

"At Croydon, at South Norwood, and at some other towns, it has been forbidden by injunction for the local authorities to pass town sewage into running waters below a defined standard of purity, and the result has been, after the failure of all other systems, a clarification of such sewage by irrigation, which not only proves successful for the purpose desired, namely, to prevent river pollution, but in its operation is a source of profit to the ratepayers. However that be, the question of profit or loss in abating nuisances, and in preventing either the undue pollution of the atmosphere, running waters, or the seashore, by town and house sewage, or by working mines and carrying on trades and manufactures, ought not too closely to be taken into account, as in some cases restrictive measures rigidly enforced would result in profit, whilst in others there might be a small loss, if that can be fairly called loss which is more than compensated by gain to the community. Towns can as well afford to pay for the means and appliances necessary to render sewage innocuous to running waters, as they can to pay for the sewers and drains which are necessary to their sanitary well-doing. We have explained in this report that abuse and pollutions of running waters are of wide extent and affect entire watersheds, so that it may be inferred that any useful remedy must be capable of being applied as widely as the pollutions extend. Some districts are notoriously more polluted than others, as, for instance, those which we have just visited where the great woollen and worsted trades are established; there the abuses and pollutions of running waters have become almost intolerable, and even trade is seriously injured in consequence. The long catalogue of pollutions and of floodings, as set forth in the evidence and in the appendix to this report, indicates the extent to which such abuses may further grow if left uncontrolled. Every witness we examined admitted the existence of many great evils, and remedial measures are in the evidence over and over again suggested, the reiterated stipulations being, that such measures shall be as general as the trades to be affected by them, and that their enforcement shall be by Government authority."

On the sewering of towns, and the application of the sewage to the soil, the Commissioners remark that the sewering of towns is a complex question, and requires to be specially studied, so as to effect the greatest amount of good at the least risk of polluting water-courses. Natural streams, as small brooks, should not be arched over and formed into sewers, neither should rivers be made the receptacles of sewage. The largest proportion of rain-water may in all cases be turned over the surface into the natural streams: it will not be necessary to form duplicate systems of sewers and drains, but it will require intelligent and careful attention to preserve surface gradients and natural outlets for storm-waters, and, where these have been tampered with, to restore and improve them. The sewers and drains of a town should provide for the removal of subsoil-water, the slop and waste-water from houses, and the contents of waterclosets. These sewers and drains may have storm-overflows in connexion with the natural streams of the district, so arranged as to prevent flooding of houses or bursting of the sewers during thunderstorms. All dry-weather sewage and such portion of the surface-water due to moderate falls of rain as finds its way to the sewers will flow down with the sewage to the outlet, and be a manageable volume either to apply by gravity, or to be pumped to land for agricultural uses. The remark may be made that, when the sewers overflow, the streams will be polluted: this is true, but the pollution will be a minimum, the sewage will be in extreme dilution, and the natural streams of the district will be in flood, and most probably muddy by grit and silt washed in from road-surfaces, and by fine particles of soil from the banks and the surfaces of the land. Floods caused by heavy rains ever have been turbid, and ever will be turbid.

The only general rules applicable to sewage irrigation in all cases, they remark, are that the works should be simple and cheap. Land to be irrigated does not require costly work in shaping and levelling; neither need there be expensive tanks to receive and store sewage. Heavy clay land, which has been ridge-and-furrow ploughed, may have the surface brought to an uniform slope by lowering the ridges and filling in the furrows, so as to prevent sewage, when applied, falling into each furrow as into a conduit, leaving the ridges comparatively bare. Such work may cost about 5*l*. per acre. Small fields may have useless hedges removed, so as to have larger areas at command. Under-draining may or may not be necessary; this must be settled after an examination of the subsoil to be dealt with. If under-draining be adopted, deep drains answer best, and these should be laid so as to extract water and admit air. Where the surface-contours will allow of interception, sewage-water from drains may be turned on to the land three or four times with advantage and with a certainty of extracting more of the salts of sewage. Sewage meadows ought to be laid out on a plan similar to that adopted for water meadows. Carriers should contour the surface, at intervals apart, in proportion to the character of the soil and the slope of the surface. Where main open carriers may be considered a nuisance, as near houses, roads, or foot-walks, they may be covered conduits having cheap outlet-valves at a chain apart; carriers in the fields may be open grips formed with plough or spade, and such as to be broken up if necessary when a change of crop is made. A cheap main carrier can be formed with common agricultural drain tiles, but T-jointed, laid half in and half out of the ground; a single pipe or length of pipes can then be removed by hand at any point to allow of irrigation, and these same pipes can be readily replaced again. Where foul smells are complained of as coming from sewage-irrigated lands the causes are in the state of the sewage and in the rude mode of using it. If old and putrid sewage is stored in large tanks, or is conveyed in large open ditches which are never cleaned, there will be offensive taint. Fresh sewage does not give off so offensive a taint, and, if conveyed at once by covered conduits to land, all nuisance ceases immediately. Cast-iron piping and hose and jet application are costly to provide and expensive to manipulate. If they are adopted, some special reason must have been urged to warrant this form of extra outlay, as for lawns and fields near houses, or, for gardens. The produce from properly irrigated land will be from five to tenfold that of the same land under ordinary cultivation. Sewage evenly and regularly applied to the growth of Italian rye-grass, on any soil, will produce from 30 to 60 tons weight of green grass on each statute acre per annum. The celebrated Craigentinny meadows near Edinburgh, principally sea sand, have produced from forty to sixty tons per annum to each acre, and let by auction at rents varying from 25*l*. to 35*l*. the acre. At South Norwood and at Worthing clay land out of which bricks are made is irrigated with town sewage, and produces from forty to fifty tons of Italian rye-grass to each acre. In neither case is the land underdrained; and Mr. Marriage, of Croydon, prefers to irrigate without draining. The reporters would by no means be understood to undervalue the advantage of draining clay lands in general. Sewage irrigation may be carried on throughout the entire year, and grass may be cut at Christmas. In early spring, and weeks before ordinary cultivation will produce green crops fit to cut, from four to five tons per acre may be got from sewaged land. At such times the grass sells at 15s. and 20s. per ton on the field. Six or seven crops of grass may be cut during the year.

It has been asserted that sewage-grown grass is unwholesome, and will not make good hay. The grass is, however, not only wholesome, according to the commissioners, but cows fed upon it give richer milk from which first-class butter may be made. The chemist proves by careful analysis that both milk and butter are better than samples produced from the same land in its ordinary state of meadow. Hay made from sewage-grown grass is also sweet and nutritious if properly got, but there is great difficulty in fully drying it during ordinary seasons.

The Leamington Congress papers have been prepared for the press by Mr. Hitchman, an extreme advocate for the earth-closet system which the Congress itself ignored, and which, as we have before said, however useful in country places, would become a horrible nuisance, and, indeed, utterly impracticable as a sanitary system, in towns, and worse than the abominable cesspool system which our towns have just been getting rid of, but which correspondents of the daily press would fain have us return to, because it is still carried on in one special form at Milan. A correspondent of the *Times*, Mr. Burchell, who rightly opposes the Milan scheme, points attention to the experiment at West Worthing. There, he remarks, the solid portion of the sewage,

* Vol. iii., p. 416. † Vol. iii., p. 426.

which constitutes the real sulliage, is separated from the water or fluid part before the soluble salts which are contained in the sulliage are dissolved, and is then carried away without the slightest annoyance either in its removal from the sewers or in its cartage, and in a manner which renders it conveniently available for fertilizing purposes. We have already given particulars of the system in use here.

The process by which this is accomplished, and which has now been in operation for upwards of twelve months, consists in the use of closed portable filters, which are placed on the sewers in such manner as that the whole of the sewage rises and enters the filters from beneath, the solid portion deposits itself and is retained in a manure-box enclosed in the filter, and the fluid part passes through and is purified by the filtering medium. The filter is lifted daily from the sewer and immediately replaced by another. This operation is performed in the early morning, but it has frequently been done in the daytime; it occupies not more than from five to ten minutes, and, he says, does not occasion the slightest annoyance to the occupiers of the houses or to any casual passer by. The fluid or water which runs from the filter is found to be sufficiently pure to admit of its flowing at once into the sea.

TOWN SURVEYORS.

IT has often been debated whether the town surveyors should have a private practice in addition to their remuneration from the local public treasury. What is necessary is, that a town surveyor should be independent of the caprices of the local authorities of towns, and of their cabals of private interests. Seeing this necessity our legislators have made it a law of the "Towns Improvement Clauses Act," that the appointment and removal of the surveyor, as well as the amount of his salary, shall be subject to the approval of the Home Secretary. This, it may easily be conceived, is obnoxious to some sort of members, and to some others who in all other things are reasonable but in those which have a colour of centralized authority.

The wisdom of the provision is profound; but that is not considered when the Bill of the Special Act is being framed, and in too many cases a clause in the Special Act excludes the application of this clause in the General Act. And the surveyors of those towns and cities in the local Acts of which the Act above mentioned is not incorporated at all are under the same disadvantage.

It is easy to cavil at this, and say that where a surveyor understands his duties and his position he will get on very well with the local authority, and he and the Corporation or Board, as it may be, will pull together and do their proper work without interference from any Secretary of State. That state of things happily exists in some places, but long experience proves that they are few in number and the practice exceptional.

The general state of things in this respect is that the surveyor, whatever his salary, for it is so where the salary is 1,000*l.* as well as where it is 100*l.*, finds himself under so many diverse influences that his natural inclination to be courteous induces him to lend an ear to all requirements, and so to become involved in the petty questions of the hour. The salaries paid are never liberal. Where they are large it is to men of good standing in the engineering profession that they are paid, and who would probably have earned by independent practice as much as, or more than, their salaries as surveyors; and of whom is required an amount of work in attending committees and preparing schemes for their approval, and after getting them approved carrying them out with such poor assistance as is afforded by the small salaries to clerks and assistants, that renders the salary, however apparently large, really a poor one, and only worth keeping because the recipient has got into a groove out of which he has not the courage to struggle; and, in fact, he becomes a mere drudge, swayed this way and that by the various committees and their separate interests. This being so with what might be called good salaries, how is it with small ones? The same, with the difference that there is less of it in degree; but not in kind.

To those people who are unacquainted with the practice of municipal government it would seem an easy thing for the surveyor to have his duties defined, and, granting that he complied with them, to take things easily. But that, often attempted, always results in disaster. The composition of municipal authorities—they must be taken as they are, and not as one would wish them to be—is such that unless the surveyor takes high ground no real improvement of the state of towns can be brought about. And it is emphatically the improvement of towns in respect of the health of the people that makes it so necessary that there should be surveyors at all. If it were the only object of the authorities to beautify the town architecturally they would do better by consulting an architect from time to time as their requirements might arise; if to improve the course of a river, to prevent or alleviate floods, if to build a bridge, if to do any work for the mere convenience of the inhabitants, they would have no difficulty in employing the proper engineer to do it for them. But it is because it is so necessary to employ an engineer continually from day to day to attend to the daily requirements of the inhabitants, that one is appointed as a permanent surveyor. The water supply of a town *may* be looked upon as a work extraneous to the surveyor's duties; so may, in some cases, the main drainage or sewerage; but neither of these works can be properly initiated and carried out without the intelligent co-operation of the resident surveyor. In the greater number of towns, however, of moderate size, these works are very properly undertaken by the surveyor himself. But it is when the great works of water-supply and sewerage are completed, that the more proper and daily work of the surveyor begins. It is when the houses are to be drained into the sewers, and how the house drainage is to be done, so as to render the outlay on the main sewers profitable, or them of any use whatever, that the efficient town surveyor shows himself; for it is a fact that very large sums of money have been spent, and the ratepayers heavily burdened in laying down sewers in towns that have not been at all proportionately benefited by them, for they have merely carried off more readily the rainfall, and that would have passed away in the greater number of cases by its old channels, or, at the best, might have been carried off by surface drains constructed at much less cost. The chief use of the sewer is to take away the house drainage,—the refuse organic matter,—from the proximity of dwelling-houses. Whether the rainfall also be turned into the sewers, is a question of economy, affected by the question, how is the sewage to be dealt with when carried to the outfall? This is one of the numerous considerations required of the town surveyor, which renders it necessary that he should possess an adequate knowledge of hydraulic engineering.

Seeing now the high qualities required to constitute a town surveyor, it is worth while to consider whether such qualities co-exist in the same individual in general with those lower ones which qualify the man for an easy agreement with the caprices of public bodies; or whether they are not rather such as are incompatible with it, and for that reason disadvantageous to the surveyor, whose tenancy of office depends entirely on the will of the body under whom he acts.

For these reasons it is very desirable that the town surveyor should be independent of that body to a degree sufficient to warrant him in pursuing the course that leads to the real improvement and the permanent prosperity of the town, and in doing something instead of dawdling his time away in the pursuit of the *ignis fatuus* pleasing everybody. The surveyor often finds it the pleasantest way, and the way that pleases many of the constituted authorities, to do nothing, or only that which may be regularly ordered in proper form of minute and resolution of the Board or the council. But that is a delusion, and leads to disaster. Many members of almost every municipal body are elected for the sole purpose of preventing anything being done. "How not to do it," is the art they study, and too many are proficient in it. If our towns were in such a state that the people could live in them with any pleasure and ease, and not be called upon by nature continually to fight against the insidious poison that enters their bodies with every inspiration, and gives them unrest and disquietude, then, indeed, the gentleman who might get up in his place at the Board and resist mere wanton outlay of money to gratify the fancy of some of his townsmen, might be admirable and useful in his day; but it is the misfortune of these same gentlemen that they do not distinguish between a true and a false economy.

The true economy of the public money is to spend it freely on those things that enable the people to cheerfully return more into the treasury, and feel that they *live* in the town, and not merely, as before they paid their rates, exist miserably in it. Our people are not afflicted with the fatal mistake that the poor Italians, they say, labour under, of suspecting the sanitary inspector to be a secret poisoner, and resist his interference to their own destruction. An English labourer knows well enough when he is in a good atmosphere, and when he is not; but his necessities compel him to endure great hardships and suffer cruel wrongs done to him by the very persons who are constituted by the law of the land his governors in the place in which he lives. Let him work in an atmosphere where he can breathe freely, and in one where he can pass his hours of rest in quietude and get up cheerfully in the morning to his work again, and he will not curse the collector of his rates and everybody and thing about him.

If that be true of the labourer it must be so also of the gentleman, for their ills and happiness in this respect are common.

It is an ascertained fact that, where the sanitary inspector has been able, by having had the drainage of the town previously well carried out, to supplement the uses of the drainage by careful and considerate operations and advice, to so instruct the poorer inhabitants of the town in the habits that conduce to their prosperity, they welcome him as their best friend, and he effectually prepares the way for the coming rate-collector. The result of it all is, that the registrar of deaths returns a continued diminution of deaths from preventible diseases every quarter, taking them generally and with consideration of the varying influences of the seasons of the year. It is evidently desirable that the town surveyor should be, to a certain degree, independent of the caprices of the local authority.

MONUMENTAL.

THE large monument to Luther at Worms will not be inaugurated for a year. This composition by Reitschel consists of twelve statues, eight medallion portraits, thirty-four coats of arms, and twenty-two *bas*-reliefs!

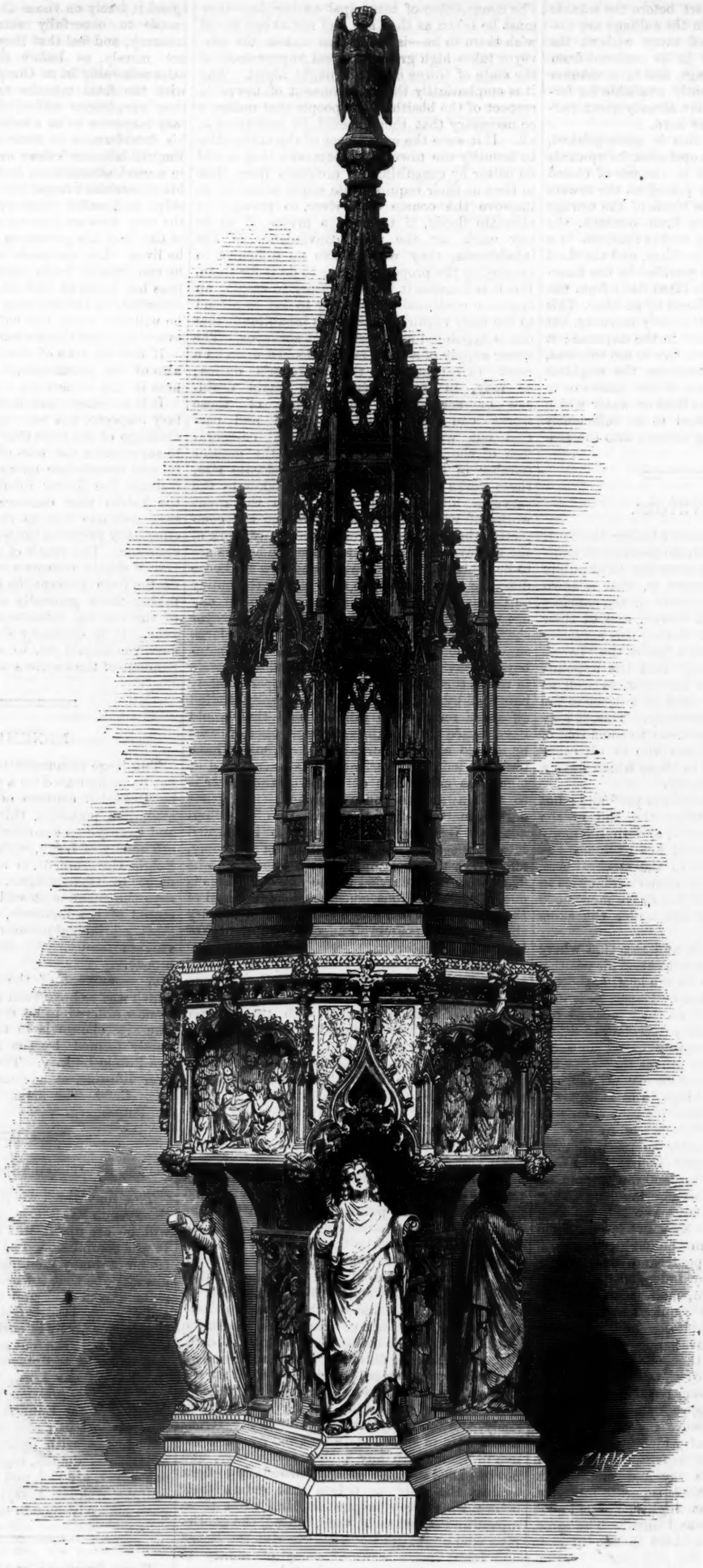
The city of Liége, with the concurrence of the Belgic Government, is about to raise a monument to Charlemagne. The *Revue Artistique* says the monument will include an equestrian statue of the monarch, and six statues representing principal persons belonging to the Carlovingian family. All the statues will be of bronze.

A monument of the Empress Catherine II., which was to have been placed at Tsarskoé-Sélo, is now ordered to be erected in St. Petersburg. The site chosen is in the centre of the square partly formed by the Alexandra Theatre and the Public Library. The figure, which is rather over life-size, stands on a pedestal containing bas-reliefs. The artist was Mr. Mikéchine, of St. Petersburg.

FONT, ST. THOMAS'S CHURCH, DUDLEY.

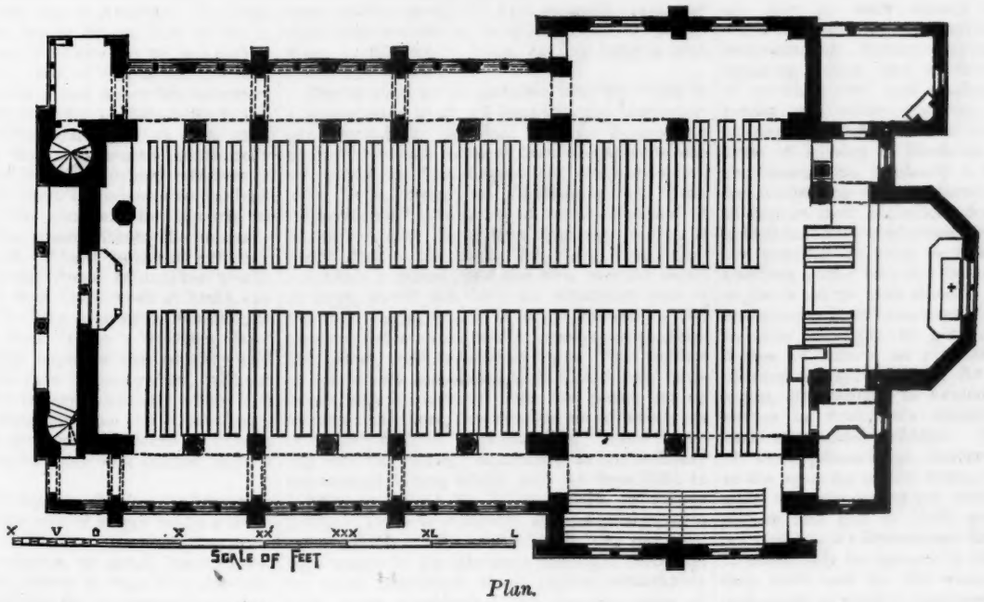
THE font which we illustrate is at present in the French Exhibition, at the close of which it will be set up in St. Thomas's Church, Dudley. It was commissioned by the Earl of Dudley, and is one of many munificent gifts which the Earl has made to that town and neighbourhood. The style of the font and cover is late fourteenth century, and is intended to harmonize with that of the church it will enrich. The total height is about 10 ft. The font is executed in Caen stone, and contains sculptured representations of the Baptism of our Lord, "Suffer little Children, &c.," the Presentation in the Temple, and the Baptism of the Eunuch. At the angles are the four evangelists; and in niches between these are angels, with instruments of praise. The ornamental details, together with those on the oak cover, are rich and carefully executed. The sculptor was Mr. Forsyth. Mr. E. Blore, F.S.A., gave his assistance in the architectural design.

TOWN SURVEYOR FOR HARROGATE.—At an adjourned meeting of the Harrogate Improvement Commission, held on the 9th inst., Mr. J. Richardson, C.E., Assistant Surveyor of Leeds, was elected surveyor for that town.



FONT, ST. THOMAS'S CHURCH, DUDLEY.

ST. ANDREW'S, HAVERSTOCK HILL, LONDON——MR. CHAS. F. HAYWARD, ARCHITECT.



Plan.

ST. ANDREW'S, HAVERSTOCK-HILL, ST. PANCRAS.

THE first designs for the Church of St. Andrew, Haverstock-hill, were matured by the architect as long as ten years ago, but since this time many disappointments have been met with, first in failures to procure an appropriate site, and then to raise sufficient funds to warrant commencing anything beyond a temporary church to be converted into schools, as soon as the permanent building could be erected. Indeed, owing to the poverty of the new district, as the wants increased, so seemed the prospect of supplying them to diminish, till at last some generous but anonymous donor, placed a sum at the disposal of the committee of the Bishop of London's fund sufficient to carry out one work, and St. Andrew's pressing claims were allowed the precedence, on condition of the plans being modified to come within the amount of 4,500*l*. Thus the architect's ideas were controlled by the strictest economy, as the amount of accommodation to be afforded was fixed at the utmost limit such a sum could be properly considered to permit with any hope of making a good substantial building, and one worthy in any degree of the objects to which it was to be dedicated.

The design resulting is a large building, containing nearly all the seats under one roof, the aisles being narrowed to mere passageways, and the transepts being shallow. Provision is added for a future western gallery if ever required. Internal effect has been chiefly aimed at, and the simplicity of roofing has been relied upon for giving dignity to an otherwise low-looking building, the total height being about 48 ft. from floor to ridge. The pulpit, reading-desk, and font are carefully wrought in Plymouth marble, and the *tout ensemble* of the interior is more striking than could be expected. The brickwork is common grey stock, with Malm dressings, and the same is used also for the interior, stone columns alternating with piers of brickwork. The contract was carried out by Messrs. Dove, Mr. Charles F. Hayward being the architect engaged.

WAGES OF BRICKLAYERS' LABOURERS IN AMERICA, AND IRISH EMIGRATION.

THERE has recently been a strike among the labourers of the building trade in New York. The wages were enormously high before, in proportion to those ruling on this side of the Atlantic; but the ultimatum of the men last on strike was 21 dollars per week for 60 hours' work,—that is to say, six days' work of ten hours, with one hour and a half meal-time out of the ten hours. Taking the dollar at 4s. 4d., this rate gives 4*l*. 11s. per week, or 236*l*. 12s. per annum,—being something like treble the salary of a junior clerk in the English Civil Service, or of an ordinary curate of the Church of England. If the expense of living in New York were in proportion to this scale of wages, the apparently (but in that case not really) high rate of wages would be naturally accounted for; but such is not the case in America. An Irish labourer with his family knows how to live in New York very nearly as cheaply as in London, so that his present rate of wages leaves him a very large balance over and above his necessary expenses, even allowing for a little extra indulgence in drink. These facts are at once sufficient to explain the remittances continually received in Ireland from friends and relatives in America, to enable them to emigrate to the land of promise, and fully accounts for the exodus which is now taking place, without the necessity of referring it to the "hard terms of grinding landlords," or to the dread of another potato famine. The fact that 12s. a week at home, are to be exchanged for 91s. a week in America, at the cost of less than 4*l*. for a fourteen days' passage, sufficiently explains the rapidity and earnestness of the rate of emigration, without further seeking for causes, especially when it is taken into consideration that the 4*l*. necessary for the voyage is generally furnished by friends already in America to those who cannot raise it at home.

It may be well to inquire whether the labourers who obtain this high rate of wages make a lever of their savings to lift them into a higher position, as skilled artisans, or small landowners. The unsatisfactory answer is, that if in nineteen cases out of twenty they do not succeed in raising themselves, they are often thrifty, and succeed in hoarding considerable sums of money; but the great bulk, from the present fearfully defective system of education in Ireland, can neither read nor write, and the consequence is, that their extreme ignorance prevents them from bettering their social position: so that even when possessing some hundreds of pounds of honestly-earned and thriftily-saved money, they continue to be hod-men and mortar-makers, without the slightest hope of improving their status in society. It is from this class that immense sums have been obtained by designing men in the mistaken cause of Fenianism; and it is by thrifty habits while in the receipt of this exceptionably high rate of wages, that the Irish labourer in America is continually enabled to command a still higher rate by means of systematic strikes—as he is well able to afford a six weeks' or even a six months' strike, if necessary, without inconvenience to himself—while he well knows the vital importance of labour-power to his employer, in a country where every kind of labour is so scarce, and where, especially, the hardy muscular frame and cheerful disposition of the Irish peasant are fully appreciated.

How it is, with continual strikes, combined with this extremely high rate of wages, that the building business of New York can be carried on, appears a mystery; the more especially as these seeming impediments do not for a moment interfere with the general activity of the business, as important lines of buildings, and immense detached warehouses, hotels, and private houses are springing up every day, in every quarter of the city. The explanation may, perhaps, be found in the present value of house property in the great American cities. I get my information on this point from *The Philadelphia Inquirer* of the 8th ult., in the advertisements for the sale or purchase of houses. These advertisements might be difficult to find in the immense mass of announcements of various forms which fill a leading American journal, but for the simple though ingenious method adopted of placing a small woodcut of a house, about ½ in. square, at the head of each advertisement connected with house property, which at once attracts the eye of the seller or purchaser of houses, and saves much hunting among hundreds of other advertisements. At the head of the list figures, "A very desirable large residence in Logan-square," the price of which is announced as 25,000 dols.; this is, upwards of 5,000*l*. Now, if that same large residence be about the size of the houses in Princes-square or Leinster-square, Bayswater, the price obtainable by the builder is more than double the present market price of houses in those English localities, and probably four times what the actual builders sold them for in the first instance; a fact which at once explains how American builders can afford to pay their labourers four guineas a week. But the reader may say, it is possible that the house in Logan-square, Philadelphia, is more like the houses about Lancaster-gate, Hyde Park; yet, that is scarcely an answer, because, except in some parts of Paris, there can be no other site in the world of equal value to the frontage to Hyde Park, and it is the prestige and value of that situation that makes the houses alluded to worth from 5,000*l*. to 6,000*l*. and upwards—a matter which has nothing to do with the builder's legitimate profit, except when he has been a land speculator as well.

But it is not at all probable that the house in Logan-square is at all equal to the Lancaster-gate houses, as we shall see; for instance, a house somewhat more of that character is also advertised as "an elegant cut stone mansion, with 40 ft. front, on Chestnut-street, West Philadelphia," the price of which is stated at 30,000 dollars. It is true that the garden is 240 ft. deep at the back; but, then, West Philadelphia is a suburb, and the site, whether small or large, would not form an important item in the total value, which is equal to nearly 6,000 guineas, and is consequently, in proportion to English prices, most excessively high. That neither of the houses mentioned is, in fact, a very large house, may be inferred from the prices set on smaller residences, the dimensions of which are accurately defined. For instance, "a new dwelling with ten rooms," equivalent to our ordinary ten-roomed house, which sells at from 800*l*. to 1,000*l*., is priced at 9,550 dollars, or nearly 2,000*l*. There is evidently, then, a good margin out of which the American builder can pay very high wages to his labourers; though, certainly, the rates mentioned above appear remarkably high, even considering the present value of building property in the States. H. N. H.

SOUTH HAYLING, HAMPSHIRE. COMPETITION.

As we suspected would be the case, the plan for making the competitors themselves select the best designs would not work satisfactorily on the 7th instant, and it was agreed to refer the selection to Mr. Longcroft, solicitor, who had been named in the particulars referee in the event of difference. That gentleman accordingly awarded the first premium to Mr. A. Gordon Hennell, Chancery-lane; the second to Mr. Crickmay, Weymouth; and the third to Mr. Milne, Sydenham. Mr. Fuller handed the premiums to them, and afterwards entertained the competitors who were present. When drinking the health of the unsuccessful competitors, Mr. Longcroft expressed a wish to couple with that toast *honourable mention* of two designs of great merit, "We bide our Time" (Mr. J. H. Metcalfe, architect, London, and Mr. Maurice Young, landscape gardener, Godalming, Surrey), and "Live and let Live," (Mr. Whitaker, Westminster) to which, of course, the representatives of each responded, and the proceedings then terminated.

It has been for some time past in contemplation to connect Hayling Island with Southsea and Portsmouth by a steam floating-bridge, in substitution of the existing ferry. This long talked-of matter would, however, be unnecessary, if we were all as independent as an Australian gentleman who visited Southsea last week. This gentleman having read a vivid description of the natural beauty of Hayling, was determined to visit the island, which he knew was only separated from Cumberland Fort and the neighbourhood by a narrow channel,—the entrance to Langstone Harbour. Walking to this channel, he found on his arrival that the ferryman was absent, and he therefore took off his clothes, strapped them on his back, and swam across,—a feat which any one acquainted with the force of the tide at this spot will readily appreciate. How much longer will the local authorities remain insensible to the necessity of improving the communication, and realizing the profit which a steam-bridge could not fail to produce?

We believe that Mr. Hennell, who obtained the first premium, will be asked to advise as to the realisation of his plans; and it will be seen by an advertisement in another column that designs are in preparation for the immediate erection of another hotel at Hayling, the contract for which is to be put up to public tender. The capabilities of Hayling as a watering-place were dwelt upon by Mr. Longcroft at the meeting, and if judiciously managed, and with a liberal expenditure of capital, the property may prove a satisfactory and lucrative investment.

TRADES' UNIONS AND ANTI-TRADES' UNIONS.

THERE are trades' union worthies at Manchester who are quite a match for those of Sheffield. The Trades' Union Commissioners are now at work among the brick-making fraternity, and the confessions of fire raising, hamstringing horses, explosions, shootings, breaking bones, and murdering, not to speak of needling clay, and wholesale destruction of bricks and other property, are as hideous as anything which came out in the revelations of villainy at Sheffield. The method of the Commission is clearly a most effectual one for compelling the murderers and incendiaries to confess their diabolical deeds: the only pity is that this very confession secures them against the punishment they so richly deserve. It is needless going into the details: they all come to just what we have stated. The officers of the commission have been more than once frustrated in their attempts to get at the authorised doings of unions as regards the expenditure of blood-money, or money for breaking human bones, fire-raising, or exploding infernal machines in workmen's dwellings and amongst their wives and children. On the fifth day of their proceedings, however, the chairman at the opening of the court, said he wished to make an announcement publicly. The examiners had got in their possession the box belonging to the Manchester Brickmakers' Union. It could only be opened by several keys, which they were told by the witnesses were in the possession of certain members of the society. He would now give notice that if those who had

got these keys chose to come forward and attend the court by ten o'clock on Wednesday morning, and have the box opened in that way, well and good; but the examiners would certainly get access to the box; and if, after this notice, no key was forthcoming, they would have the box broken open. There was plenty of time for this communication to go forth to the proper quarters, and the examiners were determined to do as he had stated. No one came forward, however, with the keys at the time appointed.

The Leeds master builders have laid a statement of their views before the Trades' Union Commission and the public, in which they first of all express a desire to recognise and adopt the following principles:—

"1. 'Free trade in labour.' Every workman has the right to sell, and every employer to purchase his labour on such terms as they mutually agree upon. Labour should form no exception to the law of free trade, which is sufficient to regulate the price of all other commodities. 2. The high or low rate of wages depends not upon the price of provisions, but on the demand and supply of labour. When many labourers are looking out for work wages will fall, and they will rise when many employers are looking out for labourers. 3. That all combinations, whether of workmen to force up or employers to keep down the price of labour, are injurious and should cease, because they interfere with the natural price of the production of labour."

Defining "labour as it should be," they say that if these principles be correct, and were carried out, then it follows that every workman would be at liberty:—

"1st. To work without joining any combination or union for such rate of wages as the demand for his labour at the time enabled him to obtain from an employer. 2nd. To work any number of hours which his desires or necessities led him to undertake. 3rd. To work at any kind of employment within the reach of his skill and experience which was at the time in greatest demand, although differing from his own particular branch of trade. 4th. To work piece or contract work, and by so doing increase, in proportion to his skill and industry, his weekly earnings, and share with his employer the profits of his labour. 5th. To embrace any opportunity for improving his individual position, or of obtaining increased remuneration for his services. The result of all this would be:—6th. That each workman would find his own level. The skilful and industrious would merit and receive his just reward, while the incompetent and idle would be left in the rear. A greater amount of work would be done in the same time, and at less cost, and thus the wealth and prosperity of the country be greatly increased."

Describing "labour as it is," the masters say that the working of trades' unions has brought about results the reverse of the above, for by their rules neither employer nor workman can be free agents. They then sum up the restrictions which are imposed by the unions.

The results of these restrictions, the masters say, in conclusion, are disastrous alike to the artizan, the employer, and the country. The use of machinery is frequently prohibited; or, when large sums have been invested in it, it may at any time be laid idle and unproductive by a sudden strike of the operatives. The employer is thus prevented from calculating with certainty the cost of his productions, is liable for broken contracts, and subject to most serious losses. What is a loss to the artizan and his employer, the Leeds masters add, cannot but be a loss to the country. Apart from the more violent outrages of trades' unionists, from which Leeds seems happily to have been free, the Leeds masters have in this statement furnished the Commission with a compendious statement of the whole case, the heads of which embrace most of the illustrations that have been adduced and the general views that have been expressed by employers and their representatives during this inquiry.

The audacity and revengeful feeling, though not violence, exercised against masters, even at Leeds, by trades' unions, may be judged of by the fact, that a master builder, Mr. Branton, has been denied "for life," the privilege of employing union men. Another, Mr. Barker, had his business suspended for two years, because he employed non-union men.

Sir Daniel Gooch, M.P., one of the Trades' Union Commissioners, who is also one of the members for the borough of Cricklade, presided at the annual dinner of the Foresters' Court, at New Swindon. The society, which comprises several hundreds, is composed almost entirely of working men connected with the Great Western Company's locomotive works at Swindon. The hon. baronet, who commenced life as a working man—a fact to which he has before alluded,—in responding to the toast of his health, said,—

"A little less than two years ago they had conferred upon him the honour of permitting him to enter the society. As one of the members of the Royal Commission appointed to inquire into the system of trades' unions, he had had to turn his attention very particularly to the effects of these upon society and the working classes. The revelations that had been made before the Commission respecting the outrages committed at Sheffield were not, as it would appear, confined to Sheffield. Scarcely less criminal or mysterious were those relating to the neighbourhood of Manchester. In fact, it seemed to be a part of a system. Men, for instance, had come forward—men holding influential positions in trades' unions, and stated before the Commission that it was monstrous that one man should be paid better than another; that intelligence, skill, industry, should go for nothing; and that the levelling system should prevail which made every man alike, whether deserving or undeserving. He was quite sure that no one here would maintain any such doctrine. What was the great charm of England? It was this, that any man, no matter what or who he was, by industry, perseverance, and merit, might rise to the highest station in the land? Could that be done by any levelling system? He hoped the working classes would look upon this matter as of far more importance to this country than even the question of reform, for it had to deal both with them and with the capitalists—the levers of trade."

Twelve months since a contest arose among the miners and ironworkers of Staveley as to whether trades' unionism or the principle of free labour should prevail, and the result has been that the non-unionists have succeeded in conquering their opponents. This new state of things has been brought about in a great measure by the firmness of Mr. Markham, managing director of the Staveley Coal and Iron Company. The workmen, to mark their sense of the benefits, both pecuniary and social, which they have received through the efforts of Mr. Markham, have subscribed together and purchased a testimonial, which has just been presented to him in the presence of a very large and influential gathering of miners and employers of labour. The testimonial consists of a silver claret-jug and waiter, and an inkstand. The cost of the testimonial has been upwards of 53*l*., the subscriptions being limited to 6d., from working men only. The claret-jug, which was chased, bore the inscription,—

"Presented to Chas. Markham, esq., by 2,566 of the workmen of the Staveley Coal and Iron Company, Limited, in grateful acknowledgment of the zeal and ability displayed by him in vindicating the rights of the British workmen to freedom of labour, by his action against the oppression of trades' unions, and also in appreciation of his uniform kindness to his workpeople. August, 1867."

Alongside this movement for the presentation of a testimonial to Mr. Markham, there has been another for the establishment of a Mechanics' Institution in the lecture-hall of the Workmen's Dining-hall at Barrow-hill. In furtherance of the latter movement, a tea party was arranged to come off previously to the presentation. A large number partook of tea in a tent near the dining-hall. The party afterwards adjourned to the Staveley Works' School-room, which was soon densely packed with workmen and visitors. The chair was taken by Mr. B. Whitworth, M.P. for Drogheda, one of the directors of the Staveley Company. Among the visitors on the platform were the Duke of Devonshire, Mr. W. Jackson, M.P., Mr. Allport (general manager of the Midland Railway Company), and various other influential gentlemen.

THE NEW HOURS OF LABOUR BILL.

THE Act for regulating the hours of labour for children, young persons, and women employed in workshops, and for other purposes relating thereto, enacts that—"'Child' shall mean a child under the age of 13 years; 'young person' shall mean a person of the age of 13 years and under the age of 18 years; 'woman' shall mean a female of the age of 18 years or upwards; 'parent' shall mean parent, guardian, or person having the custody of or control over any such child or young person; 'employed' shall mean occupied in any handicraft, whether for wages or not, under a master or under a parent as herein defined; 'handicraft' shall mean any manual labour exercised by way of trade or for purposes of gain in or incidental to the making any article or part of an article, or in or incidental to the altering, repairing, ornamenting, finishing, or otherwise adapting for sale any article; 'workshop' shall mean any room or place whatever, whether in the open air or under cover, in which any handicraft is carried on by any child, young person, or woman, and to which and over which the person by whom such child, young person, or woman is employed has the right of access and control; 'the court' shall include any justice or justices, sheriff or sheriff substitute, magistrate or magistrates, to whom jurisdiction is given by this Act.

This Act shall not apply (1) to any factory, or part of a factory, or other place subject to the jurisdiction of the inspectors of factories, in pursuance of any Act of Parliament already passed, or which shall be passed during this present session of Parliament. (2.) To any bakehouse as defined by the Bakehouse Regulation Act, 1863.

No child under the age of 8 years shall be employed in any handicraft. No child shall be employed on any one day in any handicraft for a period of more than 6½ hours, and such employment shall take place between the hours of six in the morning and eight at night. No young person or woman shall be employed in any handicraft during any period of 24 hours for more than 12 hours, with intervening periods for taking meals and rest amounting in the whole to not less than 1½ hour, and such employment shall take place only between the hours of five in the morning and nine at night. No child, young person, or woman shall be employed in any handicraft on Sunday, or after two o'clock on Saturday afternoon, except in cases where not more than five persons are employed in the same establishment, and where such employment consists in making articles to be sold by retail on the premises, or in repairing articles of a like nature to those sold by retail on the premises. No child under the age of 11 years shall be employed in grinding, in the metal trades, or in fustian cutting.

If any child, young person, or woman is employed in contravention of this Act, the following consequences shall ensue:—First, the occupier of the workshop in which such child, young person, or woman is employed shall be liable to a penalty of not more than 3*l*. Second, the parent of or the person deriving any direct benefit from the labour or having the control over the child, young person, or woman shall be liable to a penalty of not more than 20*s*., unless it appears to the court before whom the complaint is heard that the offence has been committed without the consent, connivance, or wilful default of the parent or person so benefited or having such control.

In every workshop where grinding, glazing, or polishing on a wheel, or any other process is carried on by which dust is generated and inhaled by the workmen to an injurious extent, it shall be lawful for the local authority or for the inspector of factories to require a fan or such mechanical means as may from time to time be approved by one of her Majesty's Principal Secretaries of State, under the provisions of the Factory Acts, to be provided by the occupier of the workshop within a reasonable time, under a penalty not exceeding 10*l*. nor less than 3*l*.

If, on the complaint of any officer of health, inspector of nuisances, or other officer appointed by a local authority, or of any superintendent of police, it appears to any justice of the peace that there is reasonable cause for believing that any of the provisions of this Act or of the Sanitary Act, 1866, are contravened in any workshop, it shall be lawful for such justice, by order under his hand, to empower the complainant to enter into such workshop at any time within 48 hours from the date of such order, and to examine such workshop; and any person so empowered may examine, touching any matter within the provisions of this Act or of the Sanitary Act, 1866, so far as relates to such workshop, any person whom he finds in such workshop. Any person refusing admission to any person so empowered, or obstructing him in the discharge of his duty, shall for each offence incur a penalty not exceeding 20*l*.

Under penalties against employers and parents, every child who is employed in a workshop shall attend school for at least ten hours in every week during the whole of which he is so employed.

One of the schedules appended to the Act relates to temporary and permanent exceptions to its enactments, and to its application to England and Wales, Scotland, and Ireland.

NUMEROUS CASUALTIES FROM LIGHTNING.

THE reports of deaths and injuries to person and property during the late thunder-storms throughout the country are unprecedented, at least in our recollection. At Ibury, near Banbury, one man was killed in a rickyard, and another man and a boy seriously injured. At West Bromwich, a man was killed in his cottage. At Oxhey, in Saddleworth, a man was struck and killed while travelling along with an electric machine on his back. Near Knighton, in Salop, a farm labourer was killed while on a ladder, and his son struck, but not injured. At Penegoes, near Machynlleth, the lightning passed down a chimney and killed another farm labourer: his wife was struck, but not seriously injured: a pig and a duck were killed in the yard, and furniture shattered. Two children were killed, and five others injured, at Smallburgh, in a school-room, while about to go to church: the bell-turret was first struck. At Exeter Ross, a man and horse were killed in a field. Lightning ran through a house at Heath Town, Wolverhampton, doing damage, but not injuring any of the family of a spindle-maker who were in the house at the time. A valuable horse was killed near a place called Whitehall, and another nearly killed. Rails on a branch of the Bolton Railway were torn up for some distance, the stump of a tree smashed, and a horse killed. Near Bouloc, in Haute Garonne, a man was killed by a ball of fire, and various others stunned. The *Giornale d'Udine* relates that a thunderbolt fell on the church of Anfagnano, in the district of Palmo. Four women were killed on the spot; and seventeen other persons experienced violent shocks, and were more or less injured. At Boxford a farmhouse chimney was struck, and the house extensively damaged, a duck killed, and a man hurt. At Wombwell Main colliery a cottage chimney was struck, and a tree shivered. The railway station at Wigton was set on fire through the telegraph wires and lead gas pipes conducting the electricity, melting the pipes, and then setting fire to the gas. The flames were got under before much damage was done. At Kirkaldy, in Scotland, the lightning struck the stalk of Messrs. Brown's engine works, and rent it from top to bottom. The roofs of the workshops suffered very much from the falling of the bricks. The church at St. Pé-Saint-Simon, France, has been greatly injured by lightning, which struck the clock tower, and, although leaving the bell hanging, rent the foundation: descending into the church, it tore up the flooring, destroyed the windows and several paintings, flattened a tin vessel on the high altar, and drove in the door of the tabernacle;

thence it went to the side altar and mutilated a figure of the Virgin. The edifice has been so much injured as to be no longer fit for divine worship. At Sauzet (Lot) the wife of the bell-ringer and her son had ascended to the church tower to toll the bells, in accordance with a belief very general among the peasantry there, that by doing so the effects of the lightning might be neutralised. They had scarcely commenced when the building was struck, and the woman killed on the spot. The son escaped uninjured. The timber work of the belfry was set on fire, but the flames were extinguished before any serious damage had been done.

FROM SCOTLAND.

Edinburgh.—The town-council, as improvement commissioners, have met, under the presidency of Lord Provost Chambers, who said he trusted the Act would be carried out gradually, and only piece by piece. His feeling, he said, was that they should proceed, in the first place, only to the carrying out of two streets, leaving others to be judged of afterwards, as circumstances arise. He referred to the street in Market-street to the top of Leith-wynd, and the street widening North College-street. He left to his successors in office to initiate anything more than that. These streets would not dispossess a large number of the poor classes of the inhabitants; and, besides, they would be very useful. There was at present a great demand for sites for houses of the better class, connected with manufactures and trade. Their first duty was to appoint an *interim* clerk, to put the Act into operation; and he would venture to suggest that they should invite Mr. Marwick, city clerk, to take the work. The next thing was to appoint a collector, and he would suggest that the collector of police should be appointed for the duty. A committee should also be appointed, and he would simply name the Lord Provost's committee, to serve under the City Improvements Act. Bailie Handyside seconded the proposals of the Lord Provost; and Mr. Marwick was appointed *interim* clerk.

Glasgow.—Contracts are about to be taken for the removal of the present Hutchesontown Bridge and the construction of a new one. Besides the insecurity caused by undermining from the great alteration on the bed of the river, there were other reasons which rendered it desirable that a more convenient and commodious bridge should be erected. The chief of these were the narrowness of the roadway and the steepness of the bridge and approaches. In the new structure the steep approaches will be done away with. The spacious roadway of the bridge will be practically level, the gradient not being more than 1 in 70. The architectural character of the work will be entirely different from that of the other bridges which span the Clyde at Glasgow, as it will be chiefly constructed of iron. The bridge will measure 410 ft. in length and 60 ft. in breadth, and will comprise three spans, the centre one being 114 ft. and the side ones 108 ft. wide. In order to guard against the dangerous effects of alteration in the river beds, the piers and abutments will be founded on cast-iron cylinders, each 10 ft. diameter, going right through the alluvial bed of the stream to the hard substratum of shale covering the coal measures, a depth of about 86 ft. below low water. These cylinders will be filled with hydraulic concrete, forming columns of artificial stone, to about 15 ft. from low-water mark, after which they will be filled in with solid masonry. Above the low-water level the piers and abutments will be built of white granite, with the exception of the shaft of the central piers, which will be of red polished granite, surmounted by enriched capitals. The abutment piers will be carried up 11 ft. above the roadway, forming massive rectangular towers flanking each side of the entrances to the bridge. These towers and the pedestals of the piers will be surmounted by standards of a rich design, bearing each a cluster of three globular gas-lamps. Circular recesses are left in the outside elevations of the towers for the reception of large medallion busts, in marble or bronze, as shall afterwards be decided; and the elevations of the towers and pedestals next the roadway will be filled in with panels of red polished granite. The towers will be ornamented by a bold cornice, and will harmonize with the massive architecture of the adjacent court-houses. The arches connecting the piers will be of wrought-iron, of a slightly elliptical form. They will be relieved with ornamental cast-iron work. The ironwork will be painted and decorated in harmony with the general style; and the armorial shields, lamps, standards, and bosses of consoles will be bronzed and relieved with gilding. The bridge is to be completed in two years. The engineers are Messrs. Bell & Miller.

Hamilton. — The Combination Poor-house, erected for the accommodation of the parishes of Avondale, Blantyre, Cambuslang, Dalserf, Glassford, Hamilton, East Kilbride, and Stonehouse, has just been opened for the reception of inmates. The building, which is in the Elizabethan style of architecture, has been in progress for upwards of two years, and occupies a site granted by the burgh of Hamilton, near the cavalry barracks, in Bothwell-road. The ground on which the poor-house is erected, with its surroundings, is about six acres in extent. There is accommodation for 170 inmates, for all of whom single beds are provided. There are besides three dormitories, giving additional accommodation for thirty-four boys and girls. The shares in the poor-house are divided according to the necessities of the different parishes. The dining-hall and chapel, measuring 40 ft. by 22 ft., forms a division between the two sexes, and is convenient to both. The interior of the house is abundantly supplied with lavatories and bath-rooms, and all the apartments are thoroughly lighted and ventilated. The heating of the building is effected on approved methods. The ceilings are lofty, the height of the one above ground-floor being 11 ft. 3 in.; above upper floor, 11 ft.; and above attic floor, 9 ft.; while the cubic feet of space allowed to each inmate is said to be slightly above the maximum amount allowed by the Board of Supervision. The drainage of the poor-house is also said to be effective. The designs of the building were prepared and carried out by Mr. J. Graham Peat, architect, Hamilton. The estimated cost of the work was 5,500*l.*, or at the rate of 32*l.* 7*s.* for each pauper inmate.

Wick.—The British Fishery Society, who are proprietors of Pultneytown, on the south shore of Wick Bay, are engaged in constructing a new harbour on a large scale, from the designs of Messrs. Stevenson, of Edinburgh, in the Bay of Wick, well known for its extensive fisheries of 1,000 boats, and also for its stormy seas. This work has now been going on for some years, but, owing to the great depth of water in which the breakwater is founded (being about 30 ft. at low water), and the interruption to the work in consequence of the heavy seas raised by easterly winds, the progress is slow, being only about 200 ft. per annum. The contractors are Messrs. A. & K. Macdonald, of Glasgow. This work will extend for a distance of 1,500 ft. into the Bay of Wick. It is proceeding satisfactorily, and, although as yet only about half finished, already shelters a considerable portion of the bay.

RAILWAY MATTERS.

THE extension line of the Midland Railway Company has been opened from Bedford to London. The goods terminus of the company at Agar Town, into which the line runs, has been for some time in use, but hitherto it has been worked by a branch from the Great Northern, by means of which system the Midland line is now in communication with the metropolis from Hitchin. At present this extension will be employed only for the goods and merchandise traffic, the passenger and mineral traffic being as before carried on at the stations of the Great Northern at King's Cross. Since the completion of the Midland to Bedford, the Great Northern have received tolls for the traffic put upon their line at Hitchin to the amount of about 60,000*l.* a year. By the arrangement which exists between the two companies the agreement could not be terminated except upon seven years' notice. When the Midland had obtained its parliamentary powers in 1864 the requisite notice was given, and this will expire in 1871, the Great Northern receiving until that date a minimum of 20,000*l.* a year in the shape of tolls, which will continue to be earned by the goods and minerals which will still be put upon the line until the terminal passenger station is completed in the New-road. The works for this station are being pushed vigorously forward, but the building, with the large hotel adjoining, will probably not be completed for twelve months.

A large new station has been opened on the North London Railway, in Lee-street, Kingsland-road. The new Haggerston Station commands that neighbourhood, and also the Downham-road and De Beauvoir Town, which places are situated too far off from the Dalston Junction to profit by the latter. The new station, while proving a great accommodation to a numerous colony of clerks and others resident in the suburb of Kingsland, will be a convenient point for Kingsland passengers requiring to reach the west-end of London.

The North-Eastern Railway Company have just completed the Hutton Viaduct, formed of iron girders and masonry. The trains run upon the girders, instead of between them.

Mr. C. W. Dixon, C.E., of Wakefield, and of Wickham Market, Suffolk, has just patented an elastic compensating wheel for facilitating the rounding of curves and preventing vibration and shaking. It is said this invention will cause a great saving to railway companies in the item of wear and tear.

PENZANCE PUBLIC BUILDINGS.

A LARGE pile of buildings in Penzance, of which we have before spoken, has been inaugurated. The architect is Mr. John Matthews, the town surveyor. The front elevation is in the Italian style of architecture, and is composed of a centre and two wings, each of which projects about 15 ft. The entire length of this elevation is 135 ft.; it is raised 3 ft. above the road, and is 52 ft. in height. The basement is composed of rusticated work, extending along the whole front. The chief floor is approached by a flight of steps, eleven in number, each 21 ft. wide, leading to a granite terrace 68 ft. long by 13 ft. wide. On this terrace are the principal entrances. The central entrance consists of an arched doorway, having on each side two massive three-quartered coupled columns of the Roman Doric order, with moulded entablature in full. These four columns are each cut from one piece of granite, and are 14½ ft. high, with moulded caps and bases in solid granite. The whole of the front elevation is executed in massive white granite from Messrs. Freeman's quarries at Lamorna.

The eastern elevation is 122 ft. long, 56 ft. high, and consists of three blocks, a centre, and two wings. In this elevation the dressings are of Lamorna granite, and the filling-in is of granite from Chun Castle quarries. This latter is of brownish tint.

The central portion of the buildings is entirely the property of the Penzance Public Buildings Company (Limited). Inside the principal entrance on the terrace is a handsome vestibule of 16 ft. by 17 ft., laid with caustic tiles in an ornamental design. From this vestibule open on the right and left the reading-rooms of the Penzance Institute and the Gentlemen's Newsroom. Massive chandeliers hang from the ceilings of each room. The institute room is furnished by Mr. William Bennetts, builder, of Penzance. The fittings in the library are designed by Mr. Matthews, and executed in Archangel deal by Mr. Bennetts. A light projecting gallery runs round three sides of the room, to afford access to the upper lines of shelving. Five bays are erected in the room, each 8 ft. deep, and 8 ft. wide, which will receive six leather-covered tables for the use of members. Over the chimney-piece at each end of the room are arches with fretwork, to receive the portraits of the late Mr. Joseph Carne, and the late Mr. Foxell. The length of the whole of the shelving in the room is 2,408 ft.

The large hall, the crowning feature of the building, is 80 ft. in length, 40 ft. in width, and 40 ft. in height, from the floor to the crown of the ceiling. It is lighted by fifteen large windows. The ceiling is elliptical in shape, and is divided into seven compartments by moulded perforated arches. From each arch are suspended five star-shaped gas-burners. The organ is placed at the south end of the hall, in a large arch-headed recess. The organ is decorated in gold, on grey, neutral-tinted green, and brown ground. Around the organ is an orchestra and platform calculated to accommodate a chorus of 120 persons. On each side and at the north end of the room is a balcony projecting about 7 ft., supported by iron cantilevers with front balustrades. At the north end and at the back of the balcony is a gallery to hold 135 persons. The body of the room will seat 650 persons, making a total of 1,042 persons who can be comfortably seated. The ground

floor has three wide entrances with folding doors, also entrances to both balcony and gallery by staircases on the right. Just below the entrance to the balcony of the large hall are the Masonic Hall and ante-room, lighted from east and south. Ascending a flight of stairs a room is seen, intended as the museum of the Penzance Natural History and Antiquarian Society, 34 ft. long, 27 ft. wide, and 17 ft. high. The eastern wing is the property of the Penzance Town Council. The council chamber is 28 ft. long, 20 ft. wide, and 18 ft. high.

To the north of the committee-room is the Guildhall, which is 47 ft. long, 31 ft. wide, and 21 ft. high. It has a panelled ceiling, and is lighted by four star-lights of twelve jets each. The entrance to the Guildhall for all officials is the principal entrance, while suitors and the public enter at the northern end. About 400 persons may be seated in the hall. Over the Guildhall are commodious offices for officials of the town council, local board of health, and for other borough purposes.

The western wing is the property of the Royal Geological Society of Cornwall. The principal entrance leads into the fossil museum of the Society, a room of 28 ft. by 27 ft., and 16 ft. high. The geological museum is 50 ft. long, 28 ft. wide, and 21 ft. high.

Hot-water pipes are laid on throughout the centre and east wing of the buildings. Messrs. Weekes & Co., of Chelsea, are the contractors. The water is heated by a tubular boiler fixed in the basement, and the whole of the buildings can be heated at one time, or any portion can be heated separately. The contractors who have erected the building are Messrs. Jacob Olver & Son, of Falmouth. The cost of the entire work, including fittings and furnishing, will not be much less than 15,000*l*. Mr. Yeoman has acted as contractors' foreman at Penzance, and Mr. James as clerk of the works on the part of the town.

THE NEW WORKHOUSE FOR ST. MARTIN'S-IN-THE-FIELDS.

On Monday evening, at the meeting of Guardians of St. Martin's, Mr. R. Cobbett in the chair, the minutes of a special meeting of the Board were read, setting forth that the plan of Mr. Cross for the new workhouse was adopted, in preference to a plan of Messrs. Burton & Cotton, by 7 votes to 6. Whereupon Mr. Lamb protested against the correctness of the numbers as recorded in the minutes. A letter was then read from Mr. Scott (a Guardian) also protesting against the decision of the Chairman at the special meeting. Mr. Barton said he withdrew from the said meeting on the same grounds. Mr. Scott contended that the special meeting was convened to consider the plans only, and not to decide upon them; and, therefore, he considered that the ruling of the Chairman was not correct. After some further discussion, the minutes of the special meeting were signed as being correct, and Mr. Barton gave notice of a motion to rescind the resolution of the special meeting, adopting the plan of Mr. Cross; and the whole subject will be discussed at the next meeting of the Board.

COAL BRICKS.

A BRICK-MACHINE, capable of making bricks not only of clay but of coal dust concreted with a patent composition, has been invented by Mr. George Arnott, of Gloucester, who thus describes the machinery, for which he has received protection from the Patent Office:—

"I have a pug-mill erected, with a large screw running down the centre, and to each side of the pug-mill are fastened strong steel plates, which pass through the arms of the screw, so that when either coal or clay is passed into the top, it is ground and thoroughly well mixed before reaching the bottom, when it fills a double row of square iron moulds or frames, which are endless, being hinged together, and which rows of moulds pass over two square tumblers (one at each end of the machine), which tumblers are worked by means of an iron rod from the main shaft and a rachet-wheel, and at every revolution of the main shaft the rod takes hold of one of the notches in the ratchet-wheel, drags two boxes or moulds out of the pug-mill, passes them under the iron plungers or pressers next to the mill, where they are pressed and marked with trade-mark, &c.; and at the same time the next two plungers beyond pass two complete bricks through the bottom of the machine on to an endless band running the cross or contrary way to the piler or man who takes them off, so that at every revolution of the main shaft either two coal or clay pressed bricks are made. At the low rate of sixty revolutions per minute, one of these machines would make 7,200 per hour. All the labour they require is one man to feed and another to take away."

The Uskside Engineering Company, of Newport, Monmouthshire, it seems, have nearly completed one of these machines for the Compressed Coal Company, whose extensive new works are situated at Whitecroft, near Lydney, Gloucestershire, formed for the purpose of using up he heretofore worthless small coal thrown up rom the pits in the Forest of Dean. The coal-bricks, after coming from the mill, are soaked in a rock-oil, and afterwards waterproofed; so that whenever a fire is needed, either for house or other purposes, all that has to be done is to break one of the bricks, place it in the grate or elsewhere, and set light to it. The cost, we are informed, will be very considerably below the price now charged for ordinary coals.

THE SEWAGE OF TOWNS.

SIR,—Permit me to occupy a small space in your valuable columns with a few remarks on this important subject.

First, I beg leave to introduce two new distinctive words, which are more euphonious than the terms now used, and will be convenient in discussions,—*aquine*, signifying the liquid portion, and *cloacine*, the solid portion, of the refuse of towns.

Secondly, I submit that, in dealing with the refuse of towns, *aquine* should be disposed of separately as valueless, and even deleterious.

Thirdly, I hold that without an admixture of decayed vegetable matter, *cloacine* and sand or clay will not make good earth. For what is *earth*? Is not the best earth or mould a *compound*, with a large proportion of decayed vegetable matter? As I write, leaves are falling, and will in due time become incorporated with the soil on which they fall. It seems to me that in considering earth as a disinfectant, this point has been often overlooked, and should be remembered. A. J.

HAND-WRITING ON STONE.

SIR,—Will you allow me to communicate a fact which I think will be found interesting just now?

On one of our *conversazione* evenings in Canon-row "Architectural Museum," I wanted to get something rather more interesting to visitors than heavy books of prints; and to do so I called on Sir C. Barry, who was always very kind to me, and asked him to lend me for the evening his *first sketch* in pencil, so I understood, of the Houses of Parliament, which he said he had kept carefully as a memorial of the beginning of a great work. He told me he could not oblige me that evening, but that he would do so on another occasion, and that he would show me (I asked him also for it) a *Bay* (a geometrical drawing, not a sketch) of the South Front which I so much admired, and thought the finest bit of modern Gothic in existence. These drawings must be still in existence, and I cannot help thinking how very interesting, apart from all controversy, they would now be if exhibited as specimens of architectural handwriting by a master himself. Controversy always comes of imperfect information, and absence of facts on one or both sides. If there be any doubt as to the authorship of a *letter*, the production of it immediately dispels that doubt, and the work and individuality of the writer and author at once, and without any possibility of mistake, declares themselves, for it is impossible for one man to write exactly like another. On stone it is the same: it is impossible for two men to write alike on stone: that feat can only be accomplished through the medium of a clerk, *i.e.* a third person. C. B. A.

NICE WORK AT ST. MARTIN'S, EXETER.

SIR,—A few years ago you very justly exposed to ridicule the unprincipled and dishonest mode of pointing stone walling, which prevails to such an extent in Exeter and the neighbourhood; doing it in the "tuck and point" fashion of brickwork, and not only that, but actually showing sham joints where no joints exist, and converting rough nobling, so as to look like regular range work!

Happening to be passing through Exeter a few days ago, I could not have believed that such a thorough ignorance of good workmanship and pure taste in this age of progress and correct treatment could exist, had I not myself seen the restoration, as it is called, now going on at the Church of St. Martin (it is close to the Clarence Hotel). A good Perpendicular tower, built of the red conglomerate stone, and some other from the neighbourhood, has been exposed to view by the removal of the old rough-cast. Instead of raking out the joints, and pointing them as the stones happen to be shaped, and replacing defective stones by others of the like sort, and removing any brickwork, with which in the worst days of church repairs the walls may have been cobbled, the whole surface is now being *dandyfied* by making good the deficiencies and plastering them over with compo. False joints are marked out; the string-course at the midway set-off is rounded off smooth, every member of the moulding being obliterated; and, to crown the whole, the battlements are absolutely capped with pieces of square coping, and the string-course immediately below the battlements is made of a sort of chimney-piece cornice on a flat deal board or some other wood painted white! It cannot for a moment be supposed that the work has been entrusted to any architect, but that the whole is being done under the direction of amateurs; for the city may be proud of, at least, two professional gentlemen of note, if not more; and, besides this, there is an architectural association second to none in the kingdom, and in no place is there better work being done than is now in progress at the new museum, the Church of Mary Major, and a new church on St. David's Hill. With such examples before them, and such advantages within their reach, how could the parishioners of St. Martin's allow such abominations which are now being perpetrated and perpetuated on what might have been made a good specimen of a small Devonian tower of the fifteenth century? Close by its side is a glorious specimen of a four or five-light (I forget which) window, occupying the western end of this little church. Do the churchwardens intend to immortalize their names in letters of gold inside the church with the date of this work of retrograde restoration? Perhaps some one else will tell you what is going on inside the walls. I had not the heart to enter, but walked off to my inn in sorrow and disgust.

A VISITOR.

SHAPE OF BELLS FOR PUBLIC CLOCKS.

IN a communication published in the *Builder* of the 2nd of March last, I made the following statement:—"Everybody knows that for house-clocks, &c., bells of the hemispherical form are very properly used. Nevertheless, if you want a bell for a tower, or turret, to produce a good volume of sound, and a fine quality of tone that shall be heard at a reasonable distance, it *must* be made of the long-established shape and proportion of our best church bells. And we know the reason why. Bells of the hemispherical form weighing about 4 cwt. may answer for cemeteries for obvious reasons. But the sound of heavier bells of that form is generally *tubby*, extremely doleful, and offensive."

Now, in the interest of a science to which I have directed some attention, allow me to say here is an example worth recording. A clock and a bell have recently been placed in the tower of the town-hall of Northampton; and this bell, on which the clock strikes the hours, is of the hemispherical shape alluded to, its weight being about 8 cwt. What, then, is the result? Why—though no blame attaches to the respected founders, or clock-makers—this metallic saucer speaks for itself in confirmation of the above statement. It yields a sound so peculiarly dull and disagreeable to the musical ear, that people may well exclaim, "Stop that dreadful bell!"

THOS. WALESBY.

DRY ROT.

SIR,—An important beam in the basement-story of my house has got infested with dry rot; can you suggest any remedy? The beam is about 20 ft. long, made of bog-fir, the most incorruptible of timbers. It had been in its present position upwards of fifty years without showing any decay, but about four years ago I had to build a new wall under one end of it, and not wishing to inclose the beam in new work I put a piece of oak under it. About a year ago this piece of oak was observed to be covered with dry rot, which was spreading along the beam. I took out the oak, and cut off all the decayed part of the beam and washed the beam, first with hot whitewash and afterwards with strong solution of copperas; but the rot is spreading with alarming rapidity.

The air of the room is very confined, and the beam could not be taken out without much difficulty.

J. M. B.

*** Removing the parts affected, and a wash of diluted sulphuric acid, have been found useful in a similar case.

THE ESTIMATION OF AN INCOMPLETE CONTRACT.

SIR,—There must of necessity be a right way, as well as a wrong way, of making an estimate of the value of works done under a broken contract, but I cannot find that any two builders agree upon the *modus operandi*.

In a recent case in this town (Plymouth) certain builders tendered for the erection of a villa residence within a short distance of the town: the highest tender was 3,175*l*., and the lowest 2,150*l*.,—the latter being accepted.

Owing to the failure of one of the contracting parties, the works were stopped when the walls were built and the roof-timbers in place.

To avoid any litigation, it has been agreed to submit two questions to arbitration: the one to a lawyer as to what damages are due by reason of the breach of contract; the other to a surveyor as to the actual value of the work performed.

Should the works be measured according to the present value of work and material without any reference to the contract? or, should they be measured with reference to the contract and the schedule of prices upon which such contract was founded?

Should the amount due be the value of the work already performed, or should it be the amount stated in the contract less the value of work to be performed? *

J. W. B.

*** The works should be measured and valued with reference to the contract and the schedule of prices upon which the contract was founded: the amount due is "the amount stated in the contract less the value of work to be performed." The question of damage done by breach of contract is to be separately considered.

NEW TOWN HALL, MANCHESTER.

WE are authorized by the mayor to state that, in deference to an opinion expressed in our columns and elsewhere, the following circular has, by order of the Town-hall Sub-committee, been addressed to the architects who have sent in plans in competition for the new town-hall:—

"Town-hall, Manchester, 9th September, 1867.

SIR,—You will no doubt have observed in the papers that the plans or designs sent in for the new Town-hall, with the following mottoes or devices, have been selected for the second or final competition, viz., 'St. Michael,' 'Ring out the Old, Ring in the New,' A circle within a ring, 'Time tryeth Truth,' 'Polyanthus,' 'Municipal,' Three Hebrew characters, 'Au Bon Droit.'

Considerable anxiety having been expressed on the part of the public to see the competing plans, I have, at the request of the new Town-hall Committee of the Council, to ask you to inform me *during the present week* whether you are willing that your plans should, with or without your name being attached thereto, be for fourteen days publicly exhibited.

I need hardly say that it is not proposed to exhibit the designs selected for the second competition, and unless a large proportion of the architects intimate their desire to have the plans exhibited, no public exhibition will take place.

I am, Sir, &c.,

ROBERT NEILL, Mayor."

The designs of the eight architects selected for the final competition will most likely be exhibited after the award is made; but at present such a course is deemed undesirable. There is much diversity even among the successful competitors in the manner of arranging the plan of the building, the shape of the land offering great scope for the ingenuity of architects, and an exhibition of the designs at this time would be a disadvantage, it is urged, to those who have succeeded in arranging the best plans.

The letters already received, in answer to the circular of the mayor, are chiefly in favour of an exhibition.

THE SMOKE NUISANCE.

SIR,—I take the liberty of asking your assistance in calling attention to some clauses of an Act of Parliament which has been passed with a view of suppressing the nuisance arising from the smoke of furnaces; indeed, of attaining the same end *throughout the country generally* as has been already accomplished in London and its immediate vicinity.

The Act is the 29th & 30th Vic., c. 90, and is entitled an "Act to amend the law relating to the Public Health;" it was passed on the 7th of August, 1866, but the clauses relating to the consumption of smoke did not come into operation before the 7th August, 1867: this was, of course, done in order that the owners of furnaces might have time to make such alterations as would abate the nuisance.

In this city and neighbourhood (Rochester), however, I do not think that one alteration has been made; and, from what I can observe, the same is the case everywhere; indeed, I am sure the existence of such an Act is not at all generally known.

If you would kindly look at the Act and publish some observations upon it in the *Builder*, you would be doing a great public good; for in no other way can its provisions become so widely known.

W. H. NICHOLSON.

* LIST OF TENDERS.

Willcocks	£3,175
Elliot	3,009
Clark	3,000
Adams	2,990
Trevena	2,850
Turner	2,960
Verren	2,610
Lethbridge	2,478
Harvey	2,319
Condy	2,150
Average	£2,764

SCIENTIFIC EDUCATION.

THE Oxford local examination certificates, awarded for the Manchester district, have been distributed in the Free Trade Hall, by Earl Granville, K.G.

The statistics in the report of the committee for conducting the examinations in the Manchester centre included the following among other details:—In the Manchester centre, though the number of candidates was less than in the previous year, the number of those who passed showed a considerable increase. There were examined this year, 212; last year, 223; passed this year, 145; last year, 139; per-centage of success this year, 68; last year, 62. Of these there were seniors examined, 37 this year, 45 last year; passed, 28 this year, 32 last year; per-centage of success, 76 this year, last year, 71. Of juniors 175 were examined this year, 178 last year; 117 passed this year, 107 last year; per-centage of juniors this year, 67, last year, 60. In the seniors, Manchester had passed 6 per cent. above the averages of the country, and in the juniors (in which it was last year below the average of the country) it was this year 2 per cent. above. Manchester sent one-ninth of all the seniors; it had more than one-seventh of the aggregate honours. In the number of senior candidates, Manchester still maintained its position next to London. London sent 81; Manchester, 37; Liverpool, 30; Northampton, 23; Oxford, 19. In junior candidates, Manchester, which took the lead of all the centres last year, was now exceeded by London, but it still sent more than one-sixth of the whole number of juniors. In junior honours Manchester fell below the average of the whole country. In preliminaries, the per-centage of seniors in the country was 81 per cent.; last year, 68. Manchester had passed 76 per cent. against 80 last year. In juniors for the whole country, 77 per cent. against 73; for Manchester 81, against 72. The whole of the failures of the seniors here occurred in the preliminaries, though some of them had gained honours in one or more of the sections. Oxford had wisely, from the first, dealt very strictly with this part of the subject, and had the satisfaction of seeing a gradual rise from less than 50 per cent. in 1858, the first year, to about 80 per cent. in the present year. This year, for the first time, failures in the handwriting were found mentioned at the foot of the junior lists. The total number of these was 76, of which 12 belonged to Manchester. In the Manchester seniors, in English, 34 had passed out of 37; in languages, 30; five of these being in the first division and 12 in the second. In mathematics the number was much less than last year. Among the Manchester juniors, Latin had been successfully taken up by 106 (last year, 105); French, 78 (last year, 71); Greek, 22 (last year, 18); German, 5 (last year, 8); chemistry, 6 (last year, 8). Of 20 centres, only 8 sent in candidates for chemistry, and the whole number of candidates, senior and junior, was only 104, of whom not one-half had passed. In conclusion, the report alluded with pleasure to the offer of valuable scholarships in connexion with these examinations by Baliol College, Oxford, and Owens College, Manchester.

Miscellanea.

TAUNTON HIGH CROSS.—Dr. Kinglake purposes erecting, at his own cost, a cross at the northern end of the Parade at Taunton, and Messrs. Shewbrooks, the builders, have commenced the work, by putting up a hexagonal enclosure. The donor has had a design prepared, as nearly as possible, we are told, a *fac simile* of the High Cross beneath which the Duke of Monmouth was proclaimed king in 1685. It will be 32 ft. in height. Lamps will be attached to the cross, which is to stand on three steps, and a drinking-fountain will be placed at the base.

OPENING OF THE BLACKMORE MUSEUM.—A museum, which has been founded in the city of Salisbury by Mr. William Blackmore, of Liverpool and London, has been opened. The building containing the collection, which has been erected at the cost of the founder, who is a native of the town, is of early Mediæval character, and consists of the museum and north entrance-porch, with curator's room on the south side. The building is fitted for gas. The varied collection of objects in the Blackmore Museum mainly comprises specimens belonging to the stone age of different countries, with similar implements in use among existing races of mankind.

WALCOT CEMETERY CHAPELS.—The condition of these chapels being very unsatisfactory, Mr. Clark, of Bristol, architect and surveyor, was requested to report to the Burial Board on the subject, and he informs the Board that he finds the upper stage of the tower and spire in a dilapidated and dangerous state, the first cause of which is the failure of the freestone head of the doorway leading from the staircase turret to the tower, it being of freestone hardly 6 in. thick, and not sufficient to support the superincumbent weight; that the danger has also been accelerated by the imperfect manner in which the masons' work has been erected, and the deficiency of proper bonders to tie the work together. Other defects in the chapels are also pointed out, and remedies proposed. Meantime, however, the architects of the chapels, Messrs. Hickes & Isaac, have spontaneously offered to rebuild the spire at their own cost, and the Vestry have approved of their proposal, and referred the matter to the Burial Board.

THE HOLBORN IMPROVEMENTS.—The demolition of Middle-row, Holborn, has been commenced, and in a short time the block of buildings will be removed, and a long needed metropolitan improvement, talked of for half a century or more, effected at last.

SURVEYOR TO THE WATLINGTON HIGHWAY BOARD.—This Board, at their meeting on the 4th inst., appointed Mr. Richard Eades, of Redditch, as their surveyor. Five selected candidates attended the Board, the whole of whom had their travelling expenses paid them.

SINGLE-SPAN CHURCHES. — A correspondent, "J. Y.," writes,—I may add to the information contained in your article on single-span churches that an example occurs at Monferrand, near Clermont Ferrand, in the Puy de Dome. The date (from remembrance) is of the fourteenth century, and the span about 40 ft. Chapels are built as projections from the north and south walls.

HOME FOR FATHERLESS BOYS. — At Stockwell the foundation stones of three dwellings for orphans have been laid by a lady (Mrs. Hillyard), who has contributed 20,000*l.* for the purpose. The homes will consist of terraces of houses, each house capable of accommodating eighteen or twenty boys, and presided over by a nurse; and it is considered that this plan will preserve, as far as possible in a large institution, the idea of a family, and will enable the trustees to proceed with other houses, as their funds will permit. It is also proposed to build a large school-room and dining-hall on the orphanage ground. The houses will cost from 500*l.* to 600*l.* each, and the trustees have accepted a builder's tender for the erection of three at once. A large shed has been built, which will serve for holding meetings on the ground, and can be afterwards used as a covered playground for the boys.

THE ATLANTIC TELEGRAPH COMPANY.—The report presented at a meeting of the shareholders states that 205,317*l.* have been earned by the cables during the past year; that towards the close of the financial year the revenue has had to bear the expense of two accidents to the cable of 1866, both, it is believed, the result of crushing by icebergs. The Anglo-American Company have deducted 21,896*l.* 16s. from the revenue in respect of these two events. Notwithstanding these large deductions, there remained to the credit of the revenue account a balance amounting to 28,133*l.* 16s. 5d., and out of this the board proposed to declare a dividend for the year ended 27th July ultimo, at the rate of 4 per cent., free of income-tax, upon the first 8 per Cent. Preferential Stock. The directors intend to reduce their charges to a certain extent, though not so far as has been urged upon them. Messages will be sent at an average of about 5*l.*, instead of the 10*l.*, to which the original 20*l.* had been reduced. The charges urged are 7s. 6d. a word, or about 2*l.* 10s. per message.

THE INTERNATIONAL WORKMEN'S CONGRESS AT LAUSANNE.—About sixty delegates from England, France, Germany, Italy, &c., appear to have attended the meetings of this Congress; and their proceedings, though not altogether orderly and deliberative, show that the trades'-union principles, though not under that name, are rapidly pervading the Continent. Some of the decisions of the Congress are rather startling;—for example, the "equivalence of functions,"—that is to say, that "the eight hours' labour of a carpenter or shoemaker is of equal economical value with the eight hours' labour of an astronomer or poet." They do not seem to have as yet decided, however, that the eight hours' labour of the weak or indolent is of equal economic value with the eight hours' labour of the strong or active; but no doubt they are of opinion, with our own trades' unions, that the eight hours' labour of the stupid and unskilful are of the same economical value with the eight hours' labour of the talented and skilful. No chance here for the man with "seven talents" to double them: he must bury them in the ground alongside of the "one talent" of his less willing or able fellow-workman, or share with him his "seven talents," so that truly his fellow-workman will be the hard task-master. The Congress are inclined to approve of strikes because they tend to raise wages, although they do not approve of wages at all. One of the French delegates stated that "the aims of the International Working Men's Association tended to replace the present unsatisfactory state of things by a system of practical justice."

LEEDS EXHIBITION. — The Executive Committee of the National Exhibition of Works of Art to be held at Leeds in 1868, have received a notification from the Secretary of State for India that a selection of works of Indian art will be made by Dr. Forbes Watson. The many and beautiful objects of Oriental art therein will form a most attractive and important section of the Exhibition.

FRENCH ENTERPRISE IN GREECE.—At Port Mandri a French company are at present diligently smelting down the old scoriæ, slag, and refuse from the ancient lead mines, and extracting as much as 30 tons of metal a day. The work is said to pay well, and the lead chiefly goes to England. It is calculated that there is a sufficient quantity of scoriæ between Cape Colonna and Port Mandri to supply the works for fifteen years to come.

THE CLOCK-TOWER AT LONDON BRIDGE.—A correspondent suggests that a good place to which to remove the Wellington clock tower would be to the middle of New Southwark Park. He says,—"During an hour's stroll over the park ground a few days since, I was asked by at least six persons to tell them the time. The great question (there) appeared to be, not the interview at Salzburg, not the captives at Magdala, but—'What's o'clock?'"

AN AMATEUR THEATRE PROPOSED FOR LONDON. A meeting has been held with the view of raising a company to build a theatre for amateurs, on the site of Old Lyons Inn, Strand, apparently part of the property purchased for the ill-fated Strand Hotel. A capital of 20,000*l.* was named. The working expenses were put down at 2,345*l. per annum*. An ordinary theatre in Newcastle-street might or might not pay,—we need not now go into that question,—but to suppose that the amateur actors of London could support it, and pay the shareholders a return for their capital, seems to us a wild idea.

GAS.—The following are dividends declared at the last meetings of various gas companies, viz., 10 per cent. by the Richmond Gas Company; 7½ per cent. by the West Ham Company; 6½ per cent. by the Hartlepool Gas and Water Company; 10 per cent. by the Cardiff Gaslight and Coke Company; 10 per cent. by the Belper Gas and Coke Company; and 8½ per cent. by the Sunderland Gas Company. The Gas Company at Hereford have reduced the price of gas for the public lamps to 3s. per 1,000 cubic feet. The *Hereford Times* urges a reduction to the same figure to private consumers, and advocates the purchase of the works by the corporation.

SUCCESSIVE DEATHS FROM FOUL AIR. — By a singular combination of ignorance and devotedness five persons have lost their lives at Flint. A boy was amusing himself at the chemical works of Muspratt & Co. by winding up and down a bucket used for baling out water from a shaft communicating with a drain. Whilst thus occupied the bucket caught somewhere in the shaft, and the boy got down a ladder to liberate the bucket. Poisonous gas which had collected overcame him, and he fell to the bottom. A carpenter went to rescue him and shared the same fate, as did three others in succession, and a sixth volunteer only escaped by being rapidly drawn to the top. The five were afterwards got out with grapnels, but they were all dead. Experience and warning seem to be of no use to the public in such cases as this.

ORGANS.—The *Musical Standard* says,—Messrs. Hill are carrying out some important works at the large organ in St. Peter's, Cornhill. The additions consist of a bourdon on the pedals, and the completion of the pedale, which was formerly of one octave only. Nothing has been done to the organ in the way of repairs or additions since 1840. The tuning is being altered to equal temperament. The church will not be reopened until the 22nd instant at the earliest.—— The organ in the church of St. Mary-le-Bow is to be rebuilt by Mr. Holdich. At St. Botolph's, Aldersgate, Mr. Speechley, of Camden-town, is rebuilding the organ, which is expected to be ready in about three weeks (organ-builders' time). Messrs. Gray & Davison are completing further alterations in the organ at St. Botolph's, Bishopsgate,—the works they effected in the instrument on its removal in 1866 including the extension of the swell to tenor C and the addition of couplers, and other mechanical accessories. At St. Margaret's, Westminster, Messrs. Hill have instructions to complete the organ, we are glad to announce.

MILITARY GYMNASIUM, PORTSMOUTH.—On the 2nd inst. Sir George Buller laid the foundation-stone of a gymnasium, on the left side of the new line of road across the mill-dam. Colonel Hadden explained to Lieutenant-General Sir G. Buller and the company present the object of the new building, namely, the improvement of the soldiers, and providing for them the means of innocent amusement; and as this was the first erection of the kind in Portsmouth, he considered it a fitting and pleasing opportunity of calling attention to it.

DEFACING A MONUMENT.—At the Bromsgrove Sessions lately, a boy, aged thirteen, was charged with damaging the tomb of Sir John Talbot and his two wives in Bromsgrove parish church. Defendant pleaded guilty to the charge. Mr. E. Housman, for the churchwardens, said the tomb injured was an alabaster one, and it was supposed that in an idle moment the boy had scratched away some of the letters. The churchwardens would only ask the bench to express an opinion as to what punishment they would inflict upon future offenders, as it was thought probable they would have to charge others for indecent scribbling on the organ, and other offences. Defendant was discharged on paying expenses. The tomb referred to is the one which was used as evidence in the great Shrewsbury case, and concerning which it was stated by a writer in the *Athenæum*, about two years ago, that the alabaster letters had been chiselled away, and obliterated by means of paint, in order to destroy evidence.

AMERICAN TUBE WELL.—A number of gentlemen recently assembled upon the cricket-ground of the Manchester Club, Old Trafford, to witness the sinking of a well upon a system just introduced into this country, of which Mr. Norton, of Blackfriars-street, Manchester, is local agent. Water was reached in five minutes from the commencement of the operations, and in twenty-two minutes a depth of 10 ft. had been reached; the pump had been fitted to the top of the well, and a flow of water obtained. The well consists of an iron pipe 1¼ in. in diameter, about 12 ft. long, pointed at one end, and perforated with holes about 16 in. up the pipe from the pointed extremity. A moveable iron clamp is fitted round the pipe, and, upon the principle of pile-driving, a 56 lb. hollow weight round it is raised, and allowed to drop upon the clamp: thus the pipe is driven into the ground. Earth, sand, &c., first enter the pipe through the holes, and, when these are pumped out, the theory is that pebbles rest against the pipe and form a natural filter. About 5*l.* is the cost for the completion of a well 15 ft. deep. When rock is reached the operation is more costly if it be necessary to bore the rock. One of these wells, to the depth of 15 ft. has been sunk in the Manchester Botanical Gardens. The inventor accompanied the Northern army in the late American war, and procured an unfailing water supply. He has sunk many wells in the States: one at Ithaca, New York, is said to be 120 ft. deep.

RATTENING—The derivation of this term has excited some discussion. A writer in *Notes and Queries* says,—In "Hallamshire," the district of which Sheffield is the capital, and, indeed, in Yorkshire generally, by the common people, *rat* is pronounced *rat'n*, and hence the secret mischief done by one workman to another in trade disputes was called *rattening*,—that is, doing on a larger scale what the "varmint" does on a smaller, such as "blending the scales and springs" of the cutler, cutting the "wheel-bands" of the grinder or the bellows of the blade forger, and other like injuries. These wrongs were generally perpetrated during the night, and when in the morning the sufferer asked who had done the mischief, the reply was, "The rats had been!" I believe this is the origin of a phrase with which I have been familiar for more than half a century, and which recent painful circumstances have made sadly familiar wherever an English newspaper is read. Of course, it has happened, in this as in other cases, that an expression used at first in a limited meaning has come to be used as signifying trade outrages of whatever kind. I will not say it would be impossible to split a grinding-stone in the way described by Dr. Vaughan, but I never heard of such a case. I close with a literal illustration of my etymology. An amateur in fancy engine-turning said to me the other day, "I have been *rattened*; I had just put a new cat-gut band upon my lathe, and last night the *rats* carried it off, and, I suppose, have eaten it!"

A HINT FOR THE AMALGAMATED ENGINEERS.—An official return, just published at Berlin, gives some curious particulars relative to the manufacture of railway locomotives in Germany. It appears, according to the *Pall-mall Gazette*, that in 1864 the number of locomotives on the German railways was 4,768, 574 of which were manufactured abroad, while Germany now not only builds her own locomotives, but sent 1,000 last year to other countries, such as Switzerland, Italy, France, and Russia. The number of engines now used on the railways of Germany is 5,250, 340 of which have to be replaced every year, it being calculated that a locomotive seldom lasts longer than 15 or 16 years. The largest of the German factories is that of Borsig, of Berlin, which has built 2,000 railway-engines since it was first established in 1841. Of the others, the principal are that of Maffei, in Bavaria, that of the Austrian railway companies at Vienna, Egerstorff's at Hanover, and Henschl's at Cassel.

TENDERS

For a pair of semi-detached residences, in Birkbeck-road, Acton. Mr. G. Billington, architect:—

Eydmann	£1,999 0 0
Waters	1,896 0 0
Blick & Son	1,835 0 0
Harding (accepted)	1,755 0 0

For alterations and repairs to No. 48, Wimpole-street, for Mr. W. Benson. Mr. W. A. Baker, architect. Quantities furnished by Messrs. Richardson & Waghorn:—

Henderson	£1,989 0 0
Phillips	1,847 0 0
Scrivener & White	1,843 0 0
Keyes & Head	1,737 0 0
Eaton & Chapman (accepted)	1,721 0 0

For alterations and repairs, at Gloucester House, Larkhall Rise, Clapham. Mr. H. W. Budd, architect:—

King & Son	£731 10 0
Mills & Son	725 0 0
Colls & Son	615 0 0
M'Lachlan	588 10 0
Notley	550 0 0

For alterations and additions at 191, Upper Ebury-street, Pimlico, for Mr. E. E. Price. Mr. Parker, architect:—

Saunders	£635 0 0
Wilson	615 0 0
Thompson	581 0 0
Dear	497 0 0

For farm-houses and home-steading for Earl Suffolk, Charlton, near Malmesbury, Wilts, exclusive of building stone, sand, &c. Mr. T. S. Lansdown, architect:—

Claridge	£6,577 0 0
Hallam & Co.	5,950 0 0
Liddiatt	5,495 0 0
Smith	5,118 0 0

For additions to Bentham House, Purton, Wilts, for Mr. W. J. Sadler, exclusive of timber, stone, bricks, lime, sand, and slate. Mr. T. S. Lansdown, architect:—

Liddiatt	£420 0 0

For Wroughton Schools, near Swindon, exclusive of old materials to be re-used. Mr. T. S. Lansdown, architect:—

Phillips	£545 0 0
Harris	515 0 0
Hawkins	495 0 0

For alterations and additions, Tockenham Rectory, near Wootton Bassett, Wilts. Mr. T. S. Lansdown, architect:—

Brown	£1,096 0 0
Wheeler	895 0 0
Frampton	875 0 0
Twine	860 0 0
Barrett	840 0 0
Carter	830 0 0
Liddiatt	825 0 0

For parsonage-house, in the parish of Holy Trinity, Kentish Town, inclusive of amounts for rain-water tank and hot-water supply. Messrs. Beck & Lee, architects. Quantities supplied by Messrs. Pain & Clark:—

Manley & Rogers	£2,387 0 0
Browne & Robinson	2,303 0 0
Ashby & Sons	2,280 0 0
Colls & Son	2,275 0 0
Conder	2,262 0 0
Woodward	2,230 0 0
Webb & Son	2,191 0 0
Foster	2,149 0 0

For new buildings, Norton-folgate. Messrs. J. Young & Son, architects:—

	Refuge.	Residence.
Ashby & Horner	£6,661	£1,995
Jackson & Shaw	6,557	1,989
Ashby & Sons	6,549	1,984
Jackson	6,518	1,917
Conder	6,184	1,931
Brass	6,145	1,952
Webb & Sons	6,012	1,869
Henshaw	5,904	1,794
Hart (accepted)	5,622	1,797

For dwelling-house, at Sydenham-hill, for the Rev. J. B. Brooke:—

Hills & Son	£1,769 0 0
Colls & Son	1,690 0 0
Gammon	1,677 0 0
Clemence	1 628 0 0
Jerrard	1,575 0 0
Shapley & Webster	1,540 18 0